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NRCS

Natural  
Resources  
Conservation  
Service

In cooperation with  
Tennessee Agricultural  
Experiment Station,  
Tennessee Department of  
Agriculture, Rhea County  
Board of Commissioners,  
and Rhea County Soil  
Conservation District

# Soil Survey of Rhea County, Tennessee





## How To Use This Soil Survey

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The information provided in this publication can be useful in planning the use and management of small areas. The text includes descriptions of detailed soil map units and provides an explanation of the information presented in the tables, or soil reports, which are available via the Web Soil Survey of the Natural Resources Conservation Service (accessible from the Soils Web site at <http://soils.usda.gov>). The publication also includes a glossary of terms used in the text and tables and a list of references.

Bookmarks and links in the publication allow the user to navigate from one part of the text to another. Maps showing soil lines and map unit symbols can be accessed for a particular area of interest through Web Soil Survey (by clicking on the “Soil Map” tab). The symbols on the maps represent the detailed soil map units in the area. These map units are listed in the bookmarks panel of the text. Information about the map units can be accessed by clicking on the appropriate bookmark.

The bookmarks panel of the text outlines the contents of this publication.

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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2001. Soil names and descriptions were approved in 2003. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2001. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Tennessee Department of Agriculture, the Rhea County Board of Commissioners, and the Rhea County Soil Conservation District. The survey is part of the technical assistance furnished to the Rhea County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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**Cover: The historic Rhea County Courthouse in an area of Urban land-Use/coverages complex, 2 to 12 percent slopes. (Photo courtesy of Eva Cruver)**

*Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is <http://www.nrcs.usda.gov>.*

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# Foreword

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This soil survey contains information that affects land use planning in Rhea County. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford  
State Conservationist  
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# Soil Survey of Rhea County, Tennessee

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By Richard L. Livingston and Melissa C. Oliver, Natural Resources Conservation Service

Fieldwork by Richard L. Livingston and Melissa C. Oliver, Natural Resources Conservation Service, and Billy R. Roach and D. Scott Manning, Rhea County

United State Department of Agriculture, Natural Resources Conservation Service, in cooperation with  
Tennessee Agricultural Experiment Station, Tennessee Department of Agriculture, Rhea County Board of Commissioners, and Rhea County Soil Conservation District

RHEA COUNTY is located in southeastern Tennessee, about 110 miles southeast of Nashville, 70 miles southwest of Knoxville, and 35 miles north of Chattanooga (fig. 1). The county is roughly rectangular in shape and covers an area of 215,600 acres, or about 337 square miles. About 197,700 acres are land and 17,900 acres are water (33). The county is bordered on the north by Cumberland and Roane Counties, on the south by Hamilton County, on the west by Bledsoe County, and on the east by Meigs County. The Tennessee River forms the eastern border with Meigs County. Dayton, the county seat, is in the southern part of Rhea County. Graysville, Evensville, and Spring City are other towns in the county. According to census data, the population of the county was 28,400 in 2000 (29).

This soil survey updates the soil survey of Rhea County, Tennessee, published in 1948 (30). It provides additional information about the soils and provides maps on a photographic background.

## General Nature of the County

This section gives general information about the county. It describes the history and settlement; transportation and industry; natural resources; physiography, drainage, and geology; and climate in the survey area.



Figure 1.—Location of Rhea County in Tennessee.

## History and Settlement

Rhea County was formed in 1807 when the Tennessee Legislature passed a bill to reduce the territory of Roane County and to create two new counties. This bill came to be known as the Act of 1807. The original boundaries of Rhea County were later altered by several other acts. The home of William Henry held the first seat of justice for Rhea County because no public buildings existed in the newly formed county. Henry's home was located about 4 miles northwest of present-day Dayton. This residence served as the courthouse until October 1812, when the courthouse was relocated to the Washington community. In January 1836, Rhea County was divided at the Tennessee River in order to form Meigs County (12).

The building of the railroad by Cincinnati Southern Railroad during the 1870's created and expanded many new communities, such as Spring City. The county seat was moved in July 1889 from Washington

to Smith's Cross Roads, which was located closer to the new railroad (12).

Smith's Cross Roads was named after William R. Smith, a New England schoolmaster that emigrated from Knoxville to Rhea County. The name Smith's Cross Roads was officially changed to Dayton in May 1878. Dayton became famous in 1925 for the "Scopes Trial of Evolution," which was argued by William Jennings Bryan and Clarence Darrow (12). An annual Scopes Trial Festival and reenactment commemorates the famous event. A museum is located in the basement of the courthouse and contains artifacts and photographs from the trial. The Rhea County Courthouse is listed on the National Register of Historic Places.

Evensville, formerly Darwin's Station, was renamed for the Evan Evens family, who owned a large tract of land in the survey area. In 1917, Evensville was incorporated. In 1878, the first post office was established. John H. Evens was appointed the first postmaster (12).

Grandview was first called Piney Falls. Its name was changed to Grandview because of the scenic view of the valley and mountains. In 1887, Grandview Normal Institute was started from the Grandview Academy started by the American Missionary Association. It operated until 1925. Former students of the institute held reunions in Grandview until the middle or late 1970's. A Tennessee Historical Marker on State Highway 68 stands on the edge of the old campus of Grandview Normal Institute (12).

Graysville, which is 6 miles south of Dayton, also grew because of the arrival of the Cincinnati Southern Railroad in 1880. The town was named for Billy Gray, one of the first settlers in the area. Coal and clay were both mined around Graysville beginning in the late 1800's and continuing until 1940. In 1892, an academy was established by the Seventh-day Adventist Church and Elder G.W. Colcord. A sanitarium was also established and had many patrons. It was later moved to Collegedale in Hamilton County (12).

Spring City, which was incorporated in 1890, became a growing community as a result of the railroad that was built to the area in the 1870's. Dr. W.M. Snyder was the first mayor. Initially the community was named Walnut Grove, and it was later changed to Spring City. The first post office was established in 1878. Lumber, tanbark, and other products were shipped to outside markets by rail. In the late 1800's and early 1900's, the community was a pioneer for strawberry culture in a region that shipped more strawberries than any other State in the Union (12).

## Transportation and Industry

Rhea County has an excellent network of highways and roads. U.S. Highway 27, the most traveled highway in the county, dissects the county northeast to southwest. It was one of the major north-south routes in east Tennessee before the completion of Interstate Highway 75. Other major routes include State Highways 68, 30, and 60. State Highway 68 runs west to east across the northern part of the county, passing through Spring City. State Highway 30 also runs roughly west to east across the southern section of the county, passing through Dayton. Beginning at Dayton, State Highway 60 runs southeast to Cleveland, Tennessee. Numerous secondary State Highways and county roads supplement the main arteries.

One railroad and several truck lines serve the county. Commercial air service is available in Knoxville and Chattanooga. Mark Anton Airport, owned by Dayton's municipality, serves light and medium jet aircraft for private transportation.

The Tennessee River is the only major waterway transportation route for the county. The lock at Watts Bar Dam handles an average of 3,300 vessels and 1.6 million tons of commodities per year.

Industrial enterprises include the manufacture of textile products, automotive parts, electrical appliances and parts, gravel and concrete, paper products, wood products, mattresses and bedding, and furniture. Farming and the wood industry are important enterprises in the county (5). The Tennessee Valley Authority's Watts Bar Dam and Watts Bar Nuclear Plant also provide employment opportunities in the survey area (fig. 2).

## Natural Resources

B.A. Hartman, Geologist, Natural Resources Conservation Service, prepared this section.

Soils, water, minerals, and forestland are important natural resources in Rhea County. The county has an abundant supply of fresh water and streams that commonly flow year-round. The main streams that drain the county include Richland Creek, Whites Creek, Yellow Creek, Clear Creek, Roaring Creek, Town Creek, and the Piney River (fig. 3). On the eastern border is the Tennessee River. Watts Bar Dam and Lake are in the northern section of the county, and Chickamauga Lake is in the southern section near Dayton. Springs, small streams, ponds, and wells are numerous and furnish water for domestic uses and livestock. About 126,400 acres of



**Figure 2.—The Tennessee Valley Authority’s Watts Bar Nuclear Plant supplies electricity to the Tennessee Valley region and offers employment opportunities.**

Rhea County are forested (26). Pulpwood and hardwood production are important industries in the county.

The important mineral resources of the county are limestone, sandstone, coal, and clay (fig. 4). Limestone for construction materials and roads is produced from two active quarries in the county. Several small abandoned limestone quarries and mines are located on the soil maps by special symbols. Sandstone for building stone occurs on the Cumberland Plateau. The commercial names of Crossville Sandstone and Crab Orchard stone generally refer to dimension stone that is mined from small quarries, while field stone is gathered from areas where loose sandstone is concentrated on the land surface (34). Coal is found in many of the geologic formations of the Cumberland Plateau and Cumberland Escarpment. Presently there are no

active coal mines in Rhea County, but coal has been a historically significant natural resource of the county (12). Iron ore (hematite) occurs in one geologic formation near the base of the Cumberland Escarpment. Although there are no current major businesses associated with the mining and processing of the iron ore in Rhea County, related businesses have resulted in the establishment and growth of several communities in the area, including Dayton, Rockwood, and Chattanooga. Historically, clay mining for brick and other fired products has been important to the county (12, 34). The Chattanooga Shale geologic formation is exposed in very small areas of the county. Although of limited expanse, this sedimentary rock can contain as much as 15 gallons of oil and 0.06 percent uranium, along with unusual concentrations of trace elements, phosphate, and gas. The greatest potential for



Figure 3.—The Piney River is a major stream in Rhea County.

development lies with materials that can be used for industrial and construction materials. These materials include limestone, dolomite, sand, and gravel (34).

### Physiography, Drainage, and Geology

B.A. Hartman, Geologist, Natural Resources Conservation Service, prepared this section.

Rhea County lies in two major land resource areas—the Southern Appalachian Ridges and Valleys and the Cumberland Plateau and Mountains (32). Topography in the county is variable. The highest point in the county is on the Cumberland Plateau near the Bledsoe County line. It is about 2,020 feet above mean sea level (m.s.l.). The lowest point is in the southern part of the county, near the Tennessee River and Chickamauga Lake. Summer pool of

Chickamauga Lake is about 683 feet above m.s.l. Elevation in the Ridges and Valleys portion of the county (including the Tennessee River flood plain and stream terraces) ranges from about 690 to 1,000 feet above m.s.l. The Cumberland Plateau and Mountains portion (including the Cumberland Escarpment) generally ranges from about 900 to 1,800 feet above m.s.l. in the Cumberland Escarpment area and from about 1,700 to 2,000 feet above m.s.l. in the Cumberland Plateau area. Dayton, the county seat, is in the Southern Appalachian Ridges and Valleys and is about 720 feet above m.s.l.

All surface waters of the county drain into the Tennessee River system. Most of the streams reach the Tennessee River by way of Watts Bar Lake and Chickamauga Lake. The Tennessee River flows southward and forms the eastern boundary of the county. The northern part of the county near the

Roddy community generally drains to the north and reaches Watts Bar Lake by way of Whites Creek. Important tributary streams are Sandy Creek and Laurel Creek. Camp Creek drains directly into Watts Bar Lake. The Piney River drains much of the central part of the Cumberland Plateau and flows eastward through Spring City before reaching Watts Bar Lake. Important tributaries of the Cumberland Plateau area are Edwards Branch, Dunlap Creek, Soak Creek, Stinging Fork, Rockhouse Branch, Duskin Creek, Bumbee Creek, Piney Creek, Little Piney Creek, and Moccasin Creek. Vans Creek flows to the south in the valley and enters the Piney River just before the confluence with Watts Bar Lake. Muddy Branch and Toestring Branch drain directly into Watts Bar Lake. In the central part of the county, Yellow Creek drains an area west of McDonald Bend and Clear Creek originates just west of the Cumberland Escarpment.

Both Creeks flow generally east before reaching the Tennessee River. Near Dayton, Richland Creek flows into Chickamauga Lake. Little Richland Creek, Paine Creek, Laurel Creek, Henderson Creek, Tignes Creek, Polebridge Creek, Morgan Creek, and Broyles Branch are the main tributaries of Richland Creek. In the southernmost part of the county, Roaring Creek and Hickman Branch flow into Sale Creek, near Graysville. Sale Creek flows into Hamilton County before reaching Chickamauga Lake.

The rocks of Rhea County represent five periods of the Paleozoic era of geologic time, spanning from about 600 to 300 million years ago (22). Differences in the topography of the county can be partly attributed to differential weathering (ease or resistance to weathering) of the underlying bedrock. Shale, limestone, and dolomite weather at a faster rate than sandstone, quartzite, and rocks having a large



**Figure 4.—The sandstone resource in Rhea County supports an important industry. Sandstone is used for the construction of homes and commercial buildings.**

content of chert or silica cementation. Intense folding and faulting of the rocks also influenced the weathering characteristics and played a large part in the development of the topography in the county (8).

The Southern Appalachian Ridges and Valleys region (including the Tennessee River flood plain and stream terraces) roughly covers the eastern two-thirds of the county. This region is characterized by a series of northeast-southwest oriented ridges and valleys that formed during the late Paleozoic mountain-building episode that formed the Appalachians. Rocks from the Mississippian, Devonian, Silurian, Ordovician, and Cambrian periods make up these sediments. In the central part of the county, cherty dolomite and limestone of the Ordovician and Cambrian periods form the ridges. The Copper Ridge Dolomite, Chepultepec Dolomite, and Longview Formation are the principal ridge formers. Pailo, Fullerton, and Dewey soils are common on these geologic formations. Landscapes are usually sloping to very steep and highly dissected. The less cherty Newala Formation (Mascot and Kingsport Formations Undifferentiated) are generally at the slightly lower elevations (18, 19, 20). Dewey and Fullerton soils are dominant in these areas. Minvale and Tasso soils occur on footslopes, toeslopes, fans, and stream terraces in these areas. They formed in colluvial and alluvial materials that weathered from these rock units. Wax and Rockdell soils are on flood plains and low stream terraces. They formed in alluvial material.

The main valley adjacent to the Cumberland Escarpment and other nearly level and gently sloping areas in the eastern part of the county is underlain by the Ordovician-age Chickamauga Limestone (18, 19, 20). This bedrock (consisting of limestone, dolomite, and, in some areas, shale) is the parent material for Colbert and Lyerly soils. Capshaw soils are on stream terraces and footslopes in these areas. These soils formed in a layer of transported material that overlies the fine textured soil material that weathered from the Chickamauga Limestone. Ketona and Tupelo soils formed in fine textured alluvium and the underlying residuum from this parent material. The Mississippian-age Fort Payne Chert, Devonian-age Chattanooga Shale, and Silurian-age Rockwood Formation are exposed on the western side of the main valley. These rocks are exposed mostly as thin bands or narrow ridges along the base of the Cumberland Escarpment. The Chattanooga Shale can contain as much as 15 gallons of oil and 0.06 percent uranium in specific areas. The Rockwood Formation consists of shale, siltstone, sandstone, and beds of hematite (iron ore). Pailo and Fullerton soils are common on the Fort

Payne Chert, Townley and Sunlight soils are common on the Chattanooga Shale, and Lily soils are on the Rockwood Formation.

Stream terraces and alluvial fans are scattered throughout the main valley. Waynesboro and Holston soils occur on the higher stream terraces. The alluvial parent material for these soils was probably deposited during the Pleistocene epoch. The towns of Spring City, Dayton, and Graysville are located on alluvial fans and stream terraces comprised of cobbly and sandy material that washed primarily from the Cumberland Plateau. These materials were most likely deposited during the Holocene epoch. Cobstone and Shady soils are dominant in these areas.

The stream terraces and flood plains of the Tennessee River are comprised of alluvium of varying ages. The alluvial parent materials of the higher stream terraces most likely were deposited during the Pleistocene epoch. Soils on the higher stream terraces include Etowah, Waynesboro, and Holston soils. The younger alluvium, on the lower stream terraces and in flood plain positions, which are now protected from flooding by Watts Bar Dam, was most likely deposited during the Holocene epoch. Soils on these landscapes include Staser, Egam, Shady, Wolftever, and Altavista soils.

In the northern and eastern parts of the county, there are four areas of highly dissected topography. Commonly called "The Knobs" or "River Knobs," these areas are located on Muddy Creek Ridge, in Cottonport Bend, in Smith Bend, and in Gillespie Bend. They are underlain by the Cambrian-age Rome Formation (18, 34, 35). This parent material is a heterogeneous mixture of yellow, brown, red, purple, and green siltstone, sandstone, and shale with a few thin layers of limestone or dolomite. Townley, Sunlight, and Apison soils are common in the uplands. Townley, Sunlight, and Apison soils formed primarily in residual materials. Salacoa soils formed in colluvial materials. Hamblen soils formed in alluvial materials and are common on narrow flood plains.

The western one-third of the county is within the Cumberland Plateau and Mountains (including the Cumberland Escarpment). This area is underlain by rocks of the Pennsylvanian period. Sandstone and shale with lesser amounts of siltstone, coal, and conglomerate dominate the lithology. These materials formed in ancient lagoonal swamps and tidal flats and near shore beach deposits. The surface of the Cumberland Plateau proper in Rhea County is mostly underlain by the Crooked Fork Group and the Rockcastle Conglomerate Undifferentiated (17, 18, 19, 20, 21, 23, 24). These near-surface rocks are mostly sandstone and conglomerate that are very

resistant to the weathering processes. Lily, Lonewood, and Ramsey soils are the dominant soils on the smoother parts of the Cumberland Plateau uplands. Intermingled areas of Ramsey soils and rock outcrops are common on shoulder slopes, escarpments, and narrow, convex nose slopes and ridgetops. Allegheny, Cotaco, Pope, and Philo soils and small areas of Atkins soils occur on narrow stream terraces and flood plains.

The Vandever Formation underlies this resistant sandstone cap rock. This formation is dominated by brownish and grayish shale. It is exposed along the upper part of the escarpment and in the incised drainageways of the plateau. Most areas of this formation are sloping to steep. Gilpin and Petros soils are dominant in these areas of shale bedrock. Below the Vandever Formation is a series of beds that consist primarily of sandstone, shale, and conglomerate. In order of youngest to oldest, these beds include the Newton Sandstone, the Whitwell Shale, the Sewanee Conglomerate, the Signal Point Shale, the Warren Point Sandstone, the Raccoon Mountain Formation, and the Gizzard Group Undifferentiated (18, 19, 20, 21, 23, 24). This group of Pennsylvanian-age rock layers is exposed mostly along the Cumberland Escarpment along with the shale-dominated, Mississippian-age Pennington Formation. Seams of coal are associated with many of the Pennsylvanian-age layers.

On the Cumberland Escarpment, the more resistant sandstone layers tend to form small benches and the more easily weathered shaly layers tend to form steeper, more linear slopes. The Pennington Formation is comprised mostly of shale and is at least partly covered by cobbly, stony, and bouldery colluvial materials. Soils on the Cumberland Escarpment include Gilpin and Petros soils in areas where shale lithology dominates, areas of rock outcrops where sandstone and more resistant rocks are exposed, and Bouldin soils near the base slope, on benches, and in coves where cobbly, stony, and bouldery colluvial materials have accumulated. Allen soils are dominant on the less sloping footslopes where the alluvium and colluvium contain smaller amounts of cobbles, stones, and boulders.

## Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Dayton, Tennessee, in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 39.4 degrees F and the average daily minimum temperature is 29.0 degrees. The lowest temperature on record, which occurred at Dayton on January 21, 1985, is -15 degrees. In summer, the average temperature is 75.6 degrees and the average daily maximum temperature is 87.7 degrees. The highest temperature on record, which occurred at Dayton on July 16, 1980, is 107 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual total precipitation is 56.31 inches. Of this, 29.87 inches, or about 53 percent, usually falls in April through October. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 5.94 inches at Dayton on December 30, 1969. Thunderstorms occur on about 56 days each year, and most occur between May and August.

The average seasonal snowfall is 5.9 inches. The greatest snow depth at any one time during the period of record was 10 inches, recorded on February 13, 1960. On average, 4 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 9.6 inches, recorded on February 13, 1960.

The average relative humidity in mid-afternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 64 percent of the time possible in summer and 47 percent in winter. The prevailing wind is from the south. Average windspeed is highest, around 8 miles per hour, from February through April.

## How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the

unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates; kind and amount of rock fragments; distribution of plant roots; reaction; and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in

the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can somewhat accurately predict that a given soil will have a high water table within certain depths in most years. However, they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in some adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

# General Soil Map Units

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The general soil map shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

## 1. Lily-Gilpin-Ramsey

*Moderately deep, shallow, and very shallow, gently sloping to very steep, well drained and somewhat excessively drained soils that have a loamy subsoil; formed in residuum from sandstone, siltstone, shale, or mudstone (fig. 5)*

### Setting

*Physiographic area:* Cumberland Plateau and Mountains

*Landform:* Upland plateaus and ridges

*Slope range:* 2 to 60 percent

### Composition

*Percentage of map unit in the survey area:* 39

*Extent of the soils in the map unit:*

Lily and similar soils—61 percent

Gilpin and similar soils—14 percent

Ramsey and similar soils—7 percent

Minor components—18 percent

### Soil Properties and Qualities

#### Lily

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum from sandstone and siltstone

*Surface texture:* Loam

*Slope range:* Gently sloping to very steep

#### Gilpin

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum from shale, mudstone, and siltstone

*Surface texture:* Loam

*Slope range:* Sloping to very steep

#### Ramsey

*Depth class:* Shallow and very shallow

*Drainage class:* Somewhat excessively drained

*Parent material:* Residuum from sandstone

*Surface texture:* Loam

*Slope range:* Sloping to very steep

### Minor Components

- Hendon and Lonewood soils on gently sloping and sloping broad ridge crests
- Allegheny and Cotaco soils on low stream terraces and on alluvial fans
- Jefferson, Shelocta, and Varilla soils on footslopes and the lower portions of backslopes
- Pope, Philo, Ealy, Craigsville, and Atkins soils on flood plains

### Use and Management

*Major uses:* Woodland, cropland, pasture, hayland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping to very steep areas
- The moderate available water capacity in the Lily and Gilpin soils and the very low available water capacity in the Ramsey soils
- The equipment limitation in steep and very steep wooded areas

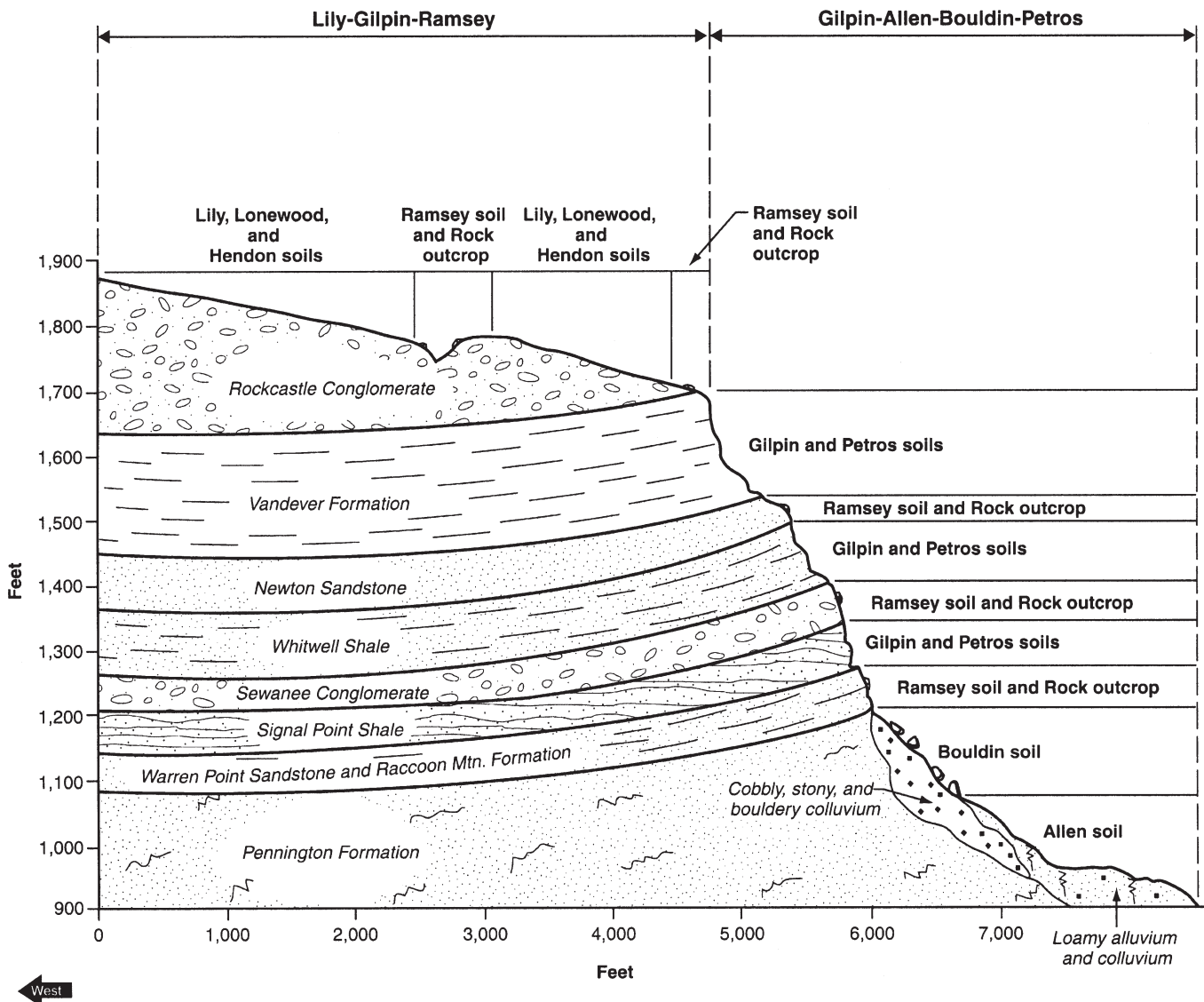


Figure 5.—The relationship of soils, geology, and parent materials in the Lily-Gilpin-Ramsey and Gilpin-Allen-Bouldin-Petros general soil map units.

*Management considerations:*

- Implementing and maintaining erosion-control practices in gently sloping to steep areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Locating woodland roads and trails as close to the contour as possible, installing water breaks and culverts, and closing and seeding roads that are no longer used
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## 2. Gilpin-Allen-Bouldin-Petros

*Very deep to shallow, gently sloping to very steep, excessively drained to well drained soils that have a loamy subsoil; formed in residuum from shale or in colluvium derived from interbedded sandstone, siltstone, and shale (fig. 5)*

### Setting

*Physiographic area:* Cumberland Plateau and Mountains and Cumberland Escarpment  
*Landform:* Escarpments and footslopes  
*Slope range:* 2 to 80 percent

### **Composition**

*Percentage of map unit in the survey area: 10*

*Extent of the soils in the map unit:*

- Gilpin and similar soils—22 percent
- Allen and similar soils—21 percent
- Bouldin and similar soils—17 percent
- Petros and similar soils—16 percent
- Minor components—24 percent

### **Soil Properties and Qualities**

#### **Gilpin**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum from shale, mudstone, and siltstone

*Surface texture:* Loam

*Slope range:* Sloping to very steep

#### **Allen**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Colluvium and alluvium from sandstone and shale

*Surface texture:* Loam

*Slope range:* Gently sloping to moderately steep

#### **Bouldin**

*Depth class:* Very deep

*Drainage class:* Somewhat excessively drained

*Parent material:* Cobbly and stony colluvium from sandstone, siltstone, and shale

*Surface texture:* Cobbly loam

*Slope range:* Steep and very steep

#### **Petros**

*Depth class:* Shallow

*Drainage class:* Excessively drained

*Parent material:* Residuum from shale and siltstone

*Surface texture:* Channery silt loam

*Slope range:* Steep and very steep

### **Minor Components**

- Ramsey soil and areas of Rock outcrop on narrow ridges and on ledges and benches
- Intermingled areas of Jefferson, Shelocta, and Varilla soils on footslopes, on alluvial fans, and in drainageways
- Small areas of Shady, Cobstone, and Hamblen soils on flood plains, alluvial fans, and stream terraces
- Isolated areas of Fullerton and Pailo soils on hills that are underlain by limestone and dolomite at the base of the escarpment

### **Use and Management**

*Major uses:* Woodland, pasture, hayland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping to very steep areas (fig. 6)
- The shallow root zone in the Petros soils and the moderately deep root zone in the Gilpin soils
- The very low available water capacity in the Petros soil and the moderate available water capacity in the Gilpin and Bouldin soils
- The equipment limitation in steep and very steep wooded areas

*Management considerations:*

- Implementing and maintaining erosion-control practices in gently sloping to steep areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Locating woodland roads and trails as close to the contour as possible, installing water breaks and culverts, and closing and seeding roads that are no longer used
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## **3. Shady-Hamblen-Waynesboro-Cobstone**

*Very deep, nearly level to moderately steep, well drained and moderately well drained soils that have a loamy or clayey subsoil; formed in alluvium derived from sandstone, siltstone, shale, and limestone*

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landform:* Flood plains, stream terraces, and alluvial fans

*Slope range:* 0 to 25 percent

### **Composition**

*Percentage of map unit in the survey area: 8*

*Extent of the soils in the map unit:*

- Shady and similar soils—21 percent
- Hamblen and similar soils—11 percent
- Waynesboro and similar soils—16 percent
- Cobstone and similar soils—8 percent
- Minor components—44 percent



Figure 6.—A small harvested area in the Gilpin-Allen-Bouldin-Petros general soil map unit. Locating roads and trails as close to the contour as possible helps to reduce the hazard of erosion.

### ***Soil Properties and Qualities***

#### **Shady**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Mixed alluvium from sandstone, siltstone, shale, limestone, and dolomite

*Surface texture:* Loam

*Slope range:* Nearly level and gently sloping

#### **Hamblen**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Parent material:* Mixed alluvium from sandstone, siltstone, shale, limestone, and dolomite

*Surface texture:* Silt loam

*Slope range:* Nearly level

#### **Waynesboro**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Surface texture:* Loam

*Slope range:* Gently sloping to moderately steep

#### **Cobstone**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Cobbly and stony alluvium mostly from sandstone with some siltstone and shale

*Surface texture:* Cobbly fine sandy loam

*Slope range:* Nearly level and gently sloping

### ***Minor Components***

- Areas of Udorthents and Urban land around Graysville, Dayton, and Spring City
- Townley, Sunlight, Apison, and Salacoa soils on hills near the base of the Cumberland Escarpment
- Colbert, Capshaw, and Lyerly soils in areas where argillaceous limestone bedrock dominate in the valley
- Allen, Holston, and Etowah soils on footslopes, alluvial fans, and stream terraces near the base of the Cumberland Escarpment

- Small areas of Pailo, Fullerton, and Dewey soils in sloping to very steep areas where cherty dolomite and limestone are dominant
- Isolated areas of Cranmore and Bloomingdale soils in depressional areas of flood plains

### **Use and Management**

*Major uses:* Pasture, hayland, cropland, woodland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping to moderately steep areas
- The seasonal high water table in the Hamblen soils
- The cobbles and stones in the Cobstone soils
- The low available water capacity in the Cobstone soils
- The potential for flooding in nearly level areas of the Shady, Hamblen, and Cobstone soils

*Management considerations:*

- Implementing and maintaining erosion-control practices in gently sloping to moderately steep areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## **4. Pailo-Fullerton-Tasso**

*Very deep, gently sloping to very steep, somewhat excessively drained to well drained soils that have a clayey or loamy subsoil; formed in residuum or colluvium derived from cherty limestone and dolomite (fig. 7)*

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landform:* Upland ridges and valleys

*Slope range:* 2 to 60 percent

### **Composition**

*Percentage of map unit in the survey area:* 23

*Extent of the soils in the map unit:*

- Pailo and similar soils—48 percent
- Fullerton and similar soils—24 percent
- Tasso and similar soils—10 percent
- Minor components—18 percent

## **Soil Properties and Qualities**

### **Pailo**

*Depth class:* Very deep

*Drainage class:* Somewhat excessively drained

*Parent material:* Residuum from cherty limestone and dolomite; the upper 24 inches of the profile may have formed in colluvium or creep

*Surface texture:* Gravelly silt loam

*Slope range:* Sloping to very steep

### **Fullerton**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Residuum from cherty limestone and dolomite; in some pedons there is 1 to 2 feet of colluvium overlying the residuum

*Surface texture:* Gravelly silt loam

*Slope range:* Gently sloping to very steep

### **Tasso**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Parent material:* Colluvium and alluvium and the underlying residuum from cherty limestone and dolomite

*Surface texture:* Gravelly loam

*Slope range:* Gently sloping to moderately steep

### **Minor Components**

- Minvale soils intermingled with the Tasso soils on footslopes
- Dewey and Waynesboro soils on high stream terraces
- Etowah and Shady soils on footslopes and stream terraces
- Hamblen, Wax, and Rockdell soils on flood plains

### **Use and Management**

*Major uses:* Woodland, pasture, hayland, cropland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping to very steep areas
- The low available water capacity of the Pailo soils and the moderate available water capacity of the Tasso soils
- The equipment limitation in steep and very steep wooded areas

*Management considerations:*

- Implementing and maintaining erosion-control practices in gently sloping to steep areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay

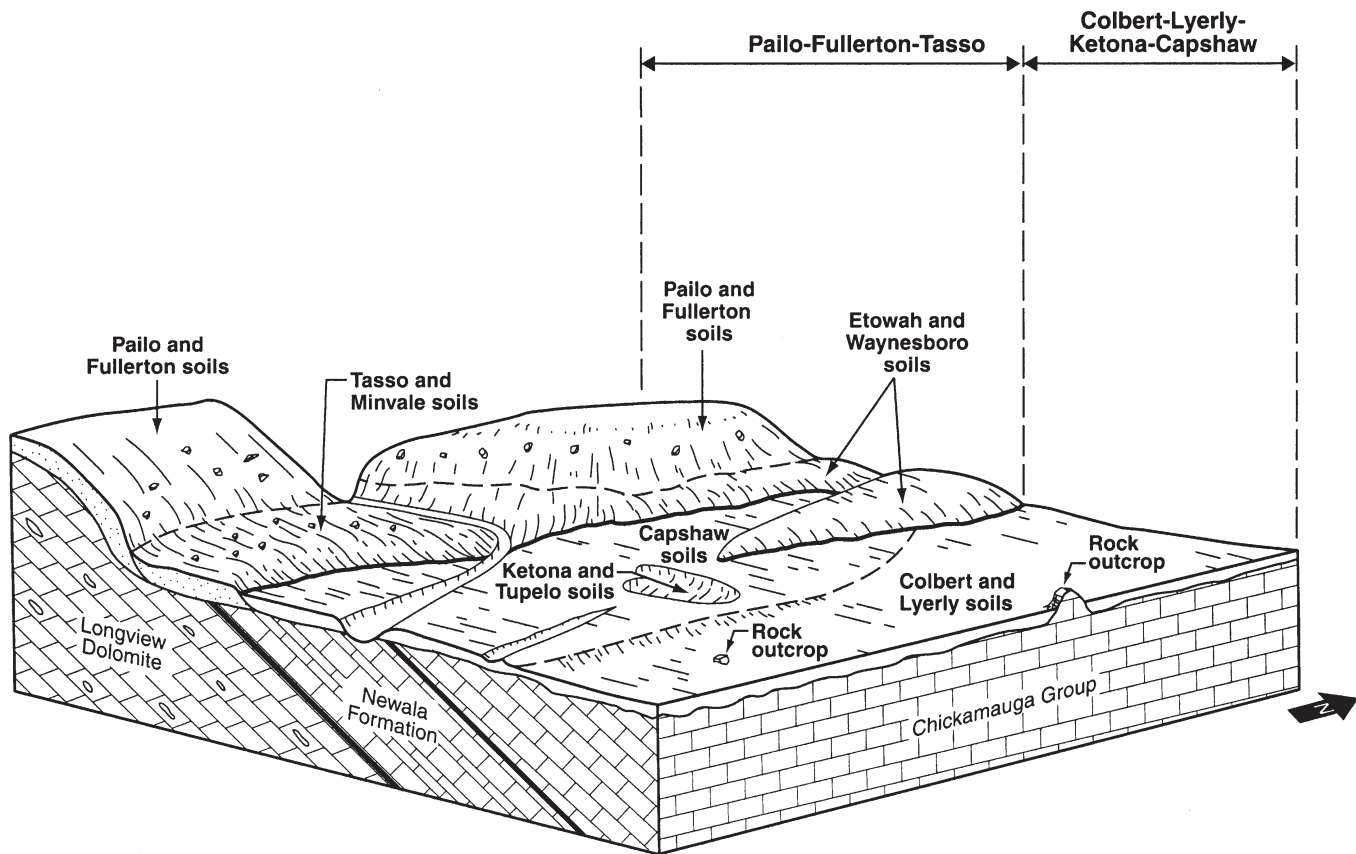


Figure 7.—The relationship of soils, geology, and parent materials in the Pailo-Fullerton-Tasso and Colbert-Lyerly-Ketona-Capshaw general soil map units.

- Locating woodland roads and trails as close to the contour as possible, installing water breaks and culverts, and closing and seeding roads that are no longer used
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## 5. Colbert-Lyerly-Ketona-Capshaw

*Very deep to moderately deep, nearly level to sloping, moderately well drained and poorly drained soils that have a clayey subsoil; formed in residuum from argillaceous limestone and dolomite or in a layer of alluvium overlying residuum from argillaceous limestone, dolomite, and calcareous shale (fig. 7)*

### Setting

**Physiographic area:** Southern Appalachian Ridges and Valleys  
**Landform:** Ridges, flats, and stream terraces  
**Slope range:** 0 to 12 percent

### Composition

*Percentage of map unit in the survey area: 5*

*Extent of the soils in the map unit:*

Colbert and similar soils—22 percent  
 Lyerly and similar soils—19 percent  
 Ketona and similar soils—12 percent  
 Capshaw and similar soils—10 percent  
 Minor components—37 percent

### Soil Properties and Qualities

#### Colbert

**Depth class:** Deep and very deep  
**Drainage class:** Moderately well drained  
**Parent material:** Residuum from argillaceous limestone, dolomite, and calcareous shale  
**Surface texture:** Silty clay loam  
**Slope range:** Gently sloping and sloping

#### Lyerly

**Depth class:** Moderately deep  
**Drainage class:** Moderately well drained  
**Parent material:** Residuum from argillaceous limestone, dolomite, and calcareous shale

*Surface texture:* Silty clay loam

*Slope range:* Gently sloping and sloping

### **Ketona**

*Depth class:* Deep and very deep

*Drainage class:* Poorly drained

*Parent material:* Alluvium or alluvium that overlies residuum from argillaceous limestone, dolomite, and calcareous shale

*Surface texture:* Silty clay loam

*Slope range:* Nearly level

### **Capshaw**

*Depth class:* Deep and very deep

*Drainage class:* Moderately well drained

*Parent material:* Alluvium that overlies residuum from argillaceous limestone, dolomite, and calcareous shale

*Surface texture:* Silt loam

*Slope range:* Gently sloping and sloping

### **Minor Components**

- Tupelo soils intermingled with the Ketona soils on flood plains and low stream terraces
- Hamblen soils on flood plains
- Isolated areas of Barfield and Talbott soils and areas of rock outcrops
- Areas of Waynesboro, Etowah, Holston, and Dewey soils on high stream terraces

### **Use and Management**

*Major uses:* Pasture, hayland, cropland, woodland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping areas
- The moderately deep root zone in the Lyerly soils
- The clayey subsoil and very slow permeability in the Colbert, Capshaw, and Lyerly soils
- The low available water capacity in the Lyerly soils and the moderate available water capacity in the Colbert soils
- The seasonal high water table in the Ketona soils

*Management considerations:*

- Implementing and maintaining erosion-control practices in sloping areas of cropland
- Preventing overgrazing and avoiding grazing when the soils are saturated
- Maintaining the proper fertility levels in areas used for pasture or hay
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## **6. Townley-Sunlight-Salacoa-Apison**

*Very deep to shallow, sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in residuum and in colluvium derived from interbedded sandstone, siltstone, and shale*

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landform:* Ridge crests, shoulder slopes, backslopes, side slopes, and footslopes

*Slope range:* 5 to 65 percent

### **Composition**

*Percentage of map unit in the survey area:* 7

*Extent of the soils in the map unit:*

Townley and similar soils—27 percent

Sunlight and similar soils—26 percent

Salacoa and similar soils—12 percent

Apison and similar soil—10 percent

Minor components—25 percent

### **Soil Properties and Qualities**

#### **Townley**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum mostly from interbedded sandstone, siltstone, and shale

*Surface texture:* Silt loam

*Slope range:* Sloping and moderately steep

#### **Sunlight**

*Depth class:* Shallow

*Drainage class:* Well drained

*Parent material:* Residuum from interbedded sandstone, siltstone, and shale

*Surface texture:* Gravelly loam

*Slope range:* Sloping to very steep

#### **Salacoa**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Colluvium and the underlying residuum from interbedded sandstone, siltstone, and shale

*Surface texture:* Silt loam

*Slope range:* Sloping to very steep

#### **Apison**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Parent material:* Residuum from interbedded sandstone, siltstone, and shale

*Surface texture:* Channery silt loam

*Slope range:* Steep and very steep

### **Minor Components**

- Hamblen soils on flood plains
- Fullerton soils on adjacent ridgetops and side slopes
- Etowah and Waynesboro soils on adjacent footslopes and stream terraces

### **Use and Management**

*Major uses:* Woodland, pasture, hayland, and wildlife habitat

*Management concerns:*

- The hazard of erosion
- The moderate depth to bedrock in the Apison and Townley soils
- The shallow depth to bedrock in the Sunlight soils
- The moderate available water capacity in the Apison soils, the low available water capacity in the Townley soils, and the very low available water capacity in the Sunlight soils
- The equipment limitation in wooded areas

*Management considerations:*

- Implementing and maintaining erosion-control practices in areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Locating woodland roads and trails as close to the contour as possible, installing water breaks and culverts, and closing and seeding roads that are no longer used
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

## **7. Waynesboro-Holston-Wolftever**

*Very deep, gently sloping to steep, well drained and moderately well drained soils that have a clayey or loamy subsoil; formed in alluvium from sandstone, siltstone, shale, and limestone*

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landform:* Stream terraces of the Tennessee River

*Slope range:* 2 to 25 percent

### **Composition**

*Percentage of map unit in the survey area:* 6

*Extent of the soils in the map unit:*

Waynesboro and similar soils—25 percent

Holston and similar soils—24 percent

Wolftever and similar soils—23 percent

Minor components—28 percent

### **Soil Properties and Qualities**

#### **Waynesboro**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Surface texture:* Loam

*Slope range:* Gently sloping to steep

#### **Holston**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Surface texture:* Loam

*Slope range:* Gently sloping and sloping

#### **Wolftever**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Parent material:* Fine-grained alluvium mostly from shale, siltstone, limestone, or dolomite

*Surface texture:* Silt loam

*Slope range:* Gently sloping

### **Minor Components**

- Etowah, Altavista, and Shady soils on stream terraces
- Areas of Talbott soils and areas of rock outcrops
- Staser and Egam soils on protected flood plains, low stream terraces, and natural levees
- Hamblen, Wax, and Rockdell soils on flood plains
- Bloomingdale, Ketona, and Tupelo soils in depressional areas and on flood plains
- Intermingled areas of Fullerton, Dewey, Pailo, Tasso, and Minvale soils where cherty limestone and dolomite are dominant

### **Use and Management**

*Major uses:* Woodland, pasture, hayland, cropland, and wildlife habitat

*Management concerns:*

- The hazard of erosion in sloping to steep areas
- The equipment limitation in steep wooded areas
- The seasonal high water table in the Wolftever soils
- The hazard of flooding in the included areas of flood plains and drainageways

*Management considerations:*

- Implementing and maintaining erosion-control practices in gently sloping to moderately steep areas of cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Locating woodland roads and trails as close to the contour as possible, installing water breaks and culverts, and closing and seeding roads that are no longer used
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife

**8. Waynesboro-Pailo-Holston**

*Very deep, gently sloping to very steep, well drained and somewhat excessively drained soils that have a clayey or loamy subsoil; formed in old alluvium or in residuum from cherty limestone or dolomite*

**Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landform:* Ridgetops, interfluvies, stream terraces, and flood plains

*Slope range:* 2 to 60 percent

**Composition**

*Percentage of map unit in the survey area:* 2

*Extent of the soils in the map unit:*

Waynesboro and similar soils—46 percent

Pailo and similar soils—25 percent

Holston and similar soils—8 percent

Minor components—21 percent

**Soil Properties and Qualities****Waynesboro**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Surface texture:* Loam

*Slope range:* Gently sloping to steep

**Pailo**

*Depth class:* Very deep

*Drainage class:* Somewhat excessively drained

*Parent material:* Residuum from cherty limestone and dolomite; the upper 24 inches of the profile may have formed in colluvium or creep

*Surface texture:* Gravelly silt loam

*Slope range:* Sloping to very steep

**Holston**

*Depth class:* Very deep

*Drainage class:* Well drained

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Surface texture:* Loam

*Slope range:* Gently sloping and sloping

**Minor Components**

- Etowah and Shady soils on the same landscapes as the major soils
- Small areas of Talbott soils and rock outcrops
- Areas of Rockdell, Wax, and Hamblen soils on narrow flood plains
- Tasso and Minvale soils on footslopes and the lower side slopes

**Use and Management**

*Major uses:* Cropland, pasture, hayland, woodland, and wildlife habitat

*Management concerns:*

- The hazard of erosion
- The low available water capacity in the Pailo soils
- The equipment limitation in steep and very steep wooded areas

*Management considerations:*

- Implementing and maintaining erosion-control practices in sloping to steep areas used for cropland
- Preventing overgrazing and maintaining the proper fertility levels in areas used for pasture or hay
- Locating logging roads and trails as close to the contour as possible
- Controlling undesirable species and replanting after harvest in areas of woodland
- Providing food, cover, and nesting areas for wildlife



# Detailed Soil Map Units

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The map units delineated on the detailed maps represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

Map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class, there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been

observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, degree of erosion, and other characteristics that affect their use. Because of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates features that affect use or management. For example, Fullerton gravelly silt loam, 5 to 12 percent slopes, is a phase of the Fullerton series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat

similar in all areas. Townley-Sunlight complex, 5 to 12 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The Rock outcrop part of Talbott-Rock outcrop complex, 5 to 25 percent slopes, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see “Contents”) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

## **Ac—Allegheny-Cotaco complex, occasionally flooded**

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Low stream terraces, alluvial fans, and flood plains

*Size of areas:* 5 to 70 acres

*Slope range:* 0 to 3 percent

*Major uses:* Woodland, pasture, and some cropland

### ***Composition***

Allegheny soil and similar components: 50 to 60 percent

Cotaco soil and similar components: 30 to 40 percent

Contrasting components: 10 to 20 percent

### ***Minor Components***

*Similar components:*

- Areas of Pope and Philo soils at the slightly lower elevations

*Contrasting components:*

- Areas of soils that do not flood
- Isolated areas of Atkins soils on flood plains and in depressions

## ***Typical Profile***

### **Allegheny**

*Surface layer:*

0 to 6 inches—brown very friable loam

*Subsurface layer:*

6 to 12 inches—dark yellowish brown very friable loam

*Subsoil:*

12 to 36 inches—dark yellowish brown friable clay loam

36 to 48 inches—yellowish brown friable gravelly clay loam

*Substratum:*

48 to 60 inches—yellowish brown very friable very gravelly sandy loam

### **Cotaco**

*Surface layer:*

0 to 4 inches—brown very friable loam

*Subsoil:*

4 to 24 inches—dark yellowish brown friable loam

24 to 36 inches—yellowish brown friable clay loam that has grayish and reddish mottles

36 to 45 inches—brownish yellow friable gravelly loam that has grayish and reddish mottles

*Substratum:*

45 to 60 inches—light brownish gray very friable very gravelly fine sandy loam

## ***Soil Properties and Qualities***

*Drainage class:* Allegheny—well drained; Cotaco—moderately well drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* Allegheny—below a depth of 60 inches; Cotaco—between depths of 24 and 36 inches

*Flooding:* Occasional

*Soil reaction:* Extremely acid and very strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

## ***Use and Management***

### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main concern in areas used for cultivated crops is the flooding.
- Some crops may be damaged by flooding in winter and early spring.

- The wetness of the Cotaco soil delays planting and harvesting in some years.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.

- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation affecting urban uses is the flooding.
- The wetness of the Cotaco soil is also a limitation affecting most urban uses.
- A suitable alternative site should be selected.

### **Interpretive Group**

*Land capability classification:* 2w

## **AeB—Allen loam, 2 to 5 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys; near the base of the Escarpment of the Cumberland Plateau and Mountains

*Landscape position:* Footslopes and alluvial fans

*Size of areas:* 15 to 70 acres

*Major uses:* Pasture, hayland, and row crops

### **Composition**

Allen soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Small areas of Waynesboro soils on landscapes similar to those of the Allen soil

*Contrasting components:*

- Areas of Lily soils on shoulder slopes
- Intermingled areas of Bouldin soils

### **Typical Profile**

*Surface layer:*

0 to 6 inches—brown very friable loam

*Subsoil:*

6 to 30 inches—strong brown friable loam

30 to 42 inches—yellowish red friable clay loam that has strong brown mottles

42 to 48 inches—yellowish red very friable gravelly sandy clay loam that has strong brown mottles

48 to 56 inches—yellowish red friable clay loam that has strong brown and red mottles

56 to 72 inches—yellowish red very friable clay loam that has strong brown and red mottles

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.

- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting urban uses.
- The moderate permeability is a limitation affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 2e

## **AeC—Allen loam, 5 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys; near the base of the Escarpment of the Cumberland Plateau and Mountains

*Landscape position:* Footslopes and alluvial fans

*Size of areas:* 5 to 235 acres

*Major uses:* Woodland, pasture, and row crops

### ***Composition***

Allen soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Small areas of Waynesboro soils

*Contrasting components:*

- Areas of Lily soils on shoulder slopes
- Intermingled areas of Bouldin soils

### **Typical Profile**

#### *Surface layer:*

0 to 6 inches—brown very friable loam

#### *Subsoil:*

6 to 30 inches—strong brown friable loam

30 to 42 inches—yellowish red friable clay loam that has strong brown mottles

42 to 48 inches—yellowish red very friable gravelly sandy clay loam that has strong brown mottles

48 to 56 inches—yellowish red friable clay loam that has strong brown and red mottles

56 to 72 inches—yellowish red very friable clay loam that has strong brown and red mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Well suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the low soil strength, and the slope.
- The moderate permeability is a limitation affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## AeD—Allen loam, 12 to 25 percent slopes

### Setting

*Physiographic area:* Southern Appalachian Ridges and Valleys; near the base of the Escarpment of the Cumberland Plateau and Mountains

*Landscape position:* Footslopes and side slopes

*Size of areas:* 5 to 345 acres

*Major uses:* Woodland and pasture

### Composition

Allen soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### Minor Components

*Similar components:*

- Small areas of Waynesboro soils

*Contrasting components:*

- Areas of Lily soils on shoulder slopes
- Intermingled areas of Bouldin soils

### Typical Profile

*Surface layer:*

0 to 6 inches—brown very friable loam

*Subsoil:*

6 to 30 inches—strong brown friable loam

30 to 42 inches—yellowish red friable clay loam that has strong brown mottles

42 to 48 inches—yellowish red very friable gravelly sandy clay loam that has strong brown mottles

48 to 56 inches—yellowish red friable clay loam that has strong brown and red mottles

56 to 72 inches—yellowish red very friable clay loam that has strong brown and red mottles

### Soil Properties and Qualities

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### Use and Management

#### Cropland

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.

- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### Pasture and hay

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### Woodland

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cutting or by applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### Wildlife habitat

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Suited*Management measures and considerations:*

- The main limitation affecting urban uses is the slope.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

***Interpretive Group****Land capability classification:* 4e**AMC—Allen-Urban land complex, 2 to 12 percent slopes*****Setting****Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Footslopes and toeslopes*Size of areas:* 70 to 120 acres*Major uses:* Urban areas***Composition***

Allen soil and similar components: 50 to 60 percent

Urban land: 30 to 40 percent

Contrasting components: 0 to 20 percent

***Minor Components****Similar components:*

- Scattered areas of Jefferson soils

- Areas of soils that have more clay in the subsoil than the Allen soil

*Contrasting components:*

- Intermingled areas of Bouldin soils in positions similar to those of the Allen soil
- Small areas of Cobstone soils in the slightly lower positions

***Typical Profile*****Allen***Surface layer:*

0 to 6 inches—brown very friable loam

*Subsoil:*

6 to 30 inches—strong brown friable loam

30 to 42 inches—yellowish red friable clay loam that has strong brown mottles

42 to 48 inches—yellowish red very friable gravelly sandy clay loam that has strong brown mottles

48 to 56 inches—yellowish red friable clay loam that has strong brown and red mottles

56 to 72 inches—yellowish red very friable clay loam that has strong brown and red mottles

**Urban land**

The Urban land mostly consists of areas where the surface is covered by roads, streets, parking lots, commercial buildings, houses, and other types of impervious material. In places, the natural drainage pattern has been altered by a system of ditches and storm drains. The underlying soil material is not observable. A typical profile of Urban land is not given.

***Properties and Qualities of the Allen Soil****Drainage class:* Well drained*Permeability:* Moderate*Available water capacity:* High*Soil reaction:* Very strongly acid or strongly acid*Depth to bedrock:* More than 60 inches*Shrink-swell potential:* Low***Use and Management*****Urban development***Suitability:* Well suited

Management measures and considerations follow.

*Site considerations:*

- The hazard of erosion is a major management concern during construction.
- A well designed erosion-control plan is needed.
- Erosion barriers, diversions, and rock-lined or vegetated waterways are important management practices.

- Timely establishment of vegetation in bare areas should be a priority.
- Plant species that can tolerate a wide range of soil conditions grow best.
- Providing a good seedbed, maintaining the proper fertility level, and mulching seeded areas help to establish a protective cover of vegetation.
- Intensive measures for establishing vegetation, such as hydroseeding and sodding, may be needed in problem areas.
- A layer of concrete, asphalt, coarse gravel, gabion stone, or riprap helps to control erosion in areas where vegetation cannot be established.
- Differential settling is a management concern in areas of fill material.
- The load-bearing strength, the shrink-swell potential, surface runoff, and storm drainage management are concerns affecting urban development.

*Dwellings:*

- The slope and the shrink-swell potential in the subsoil are the major limitations affecting sites for dwellings.
- Designing buildings and structures so that they conform to the natural slope of the land reduces the need for landshaping.

*Sanitary facilities:*

- The slope and the moderate permeability in the subsoil are moderate limitations affecting sites for septic tank absorption fields.
- Designing septic tank systems so that they conform to the existing slope and installing specially designed systems help to overcome the soil limitations.

*Lawns and landscaping:*

- Providing a good seedbed, maintaining the proper fertility level, and mulching seeded areas help to establish ground cover.

*Small commercial buildings:*

- The slope is a moderate limitation on sites for small commercial buildings.
- Landshaping may be needed to overcome the slope on sites for small commercial buildings.

*Local roads and streets:*

- The low soil strength and the slope are moderate limitations on sites for local roads and streets.
- Adding gravel or other suitable subgrade material helps to prevent the road damage caused by the low soil strength.
- Designing roads so that they follow the natural contour and landshaping help to overcome the slope limitation.

- Onsite investigation is needed to determine the limitations affecting any proposed use.

***Interpretive Group***

*Land capability classification:* None assigned

**AnB—Altavista loam, 1 to 5 percent slopes**

***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Steam terraces

*Size of areas:* 5 to 160 acres

*Major uses:* Cropland, pasture, and hay

***Composition***

Altavista soil and similar components: 80 to 95 percent

Contrasting components: 10 to 20 percent

***Minor Components***

*Similar components:*

- Scattered areas of Shady and Holston soils

*Contrasting components:*

- Intermingled areas of Wolftever soils
- Areas of soils that have a seasonal water table between depths of 12 and 18 inches

***Typical Profile***

*Surface layer:*

0 to 6 inches—dark yellowish brown friable loam

*Subsoil:*

6 to 19 inches—yellowish brown friable clay loam

19 to 27 inches—yellowish brown friable clay loam that has light brownish gray mottles

27 to 58 inches—yellowish brown friable clay loam that has dark brown and grayish brown mottles

58 to 70 inches—yellowish brown friable loam that has dark brown, strong brown, and gray mottles

***Soil Properties and Qualities***

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* Between depths of 18 and 40 inches

*Flooding:* None

*Soil reaction:* Very strongly acid to moderately acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

## ***Use and Management***

### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the wetness.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate wetness should be selected for planting.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate wetness grow best.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.

- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the wetness and the low soil strength.
- Special measures are needed to help overcome subsurface drainage problems.
- This soil is best suited to dwellings without basements.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

## ***Interpretive Group***

*Land capability classification:* 2e

## **AsF—Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Dissected ridges and side slopes

*Size of areas:* 5 to 645 acres

*Major uses:* Woodland

### ***Composition***

Apison soil and similar components: 25 to 55 percent

Sunlight soil and similar components: 20 to 50 percent

Salacoa soil and similar components: 15 to 40 percent

Contrasting components: 5 to 10 percent

### Minor Components

#### Similar components:

- Intermingled areas of Townley soils

#### Contrasting components:

- Isolated areas of shale and sandstone rock outcrops

### Typical Profile

#### Apison

##### Surface layer:

0 to 5 inches—brown very friable channery silt loam

##### Subsoil:

5 to 23 inches—dark yellowish brown friable channery silt loam

23 to 37 inches—strong brown friable channery loam

##### Bedrock:

37 to 60 inches—brownish soft siltstone and shale

#### Sunlight

##### Surface layer:

0 to 8 inches—dark yellowish brown very friable gravelly loam

##### Subsoil:

8 to 17 inches—strong brown friable very gravelly clay loam that has yellowish red mottles

##### Soft bedrock:

17 to 48 inches—reddish tilted sandstone and sandy shale that can be dug with a spade

#### Salacoa

##### Surface layer:

0 to 5 inches—dark yellowish brown very friable silt loam

##### Subsoil:

5 to 20 inches—yellowish brown very friable gravelly silt loam

20 to 35 inches—strong brown friable gravelly silt loam

35 to 62 inches—strong brown friable very gravelly silt loam

##### Bedrock:

62 inches—soft shale interbedded with reddish sandstone and siltstone

### Soil Properties and Qualities

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Apison—moderate; Sunlight—very low; Salacoa—high

*Soil reaction:* Apison and Salacoa—very strongly acid

to moderately acid; Sunlight—very strongly acid or strongly acid

*Depth to bedrock:* Apison—20 to 40 inches to soft bedrock; Sunlight—10 to 20 inches to soft bedrock; Salacoa—more than 60 inches

*Shrink-swell potential:* Low

### Use and Management

#### Cropland

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting cultivated crops are erosion and the depth to bedrock in areas of the Sunlight soil.

#### Pasture and hay

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the slope, the moderate available water capacity of the Apison soil, and the very low available water capacity of the Sunlight soil.
- The slope increases the difficulty of properly managing pastures and limits the use of these soils as hayland.

#### Woodland

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion and the equipment limitation.
- Seedling mortality and the hazard of windthrow are additional concerns in areas of the Apison and Sunlight soils, and plant competition is an additional concern in areas of the Salacoa soil.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be

a problem when establishing a new forest crop in areas of the Salacoa soil.

- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth and the very low available water capacity of the Sunlight soil.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone in the Sunlight soil.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is good in areas of the Apison and Salacoa soils and fair in areas of the Sunlight soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock in areas of the Apison and Sunlight soils and the slope.
- A more suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 7s

## **At—Atkins loam, frequently flooded**

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Flood plains and depressions

*Size of areas:* 5 to 185 acres

*Slope range:* 0 to 2 percent

*Major uses:* Woodland, pasture, and hay

### **Composition**

Atkins soil and similar components: 80 to 90 percent

Contrasting components: 10 to 20 percent

### **Minor Components**

*Similar components:*

- Scattered areas of soils that have less sand in the subsoil than the Atkins soil

*Contrasting components:*

- Intermingled areas of Pope and Philo soils
- Small areas of Cotaco soils in the slightly higher positions

### **Typical Profile**

*Surface layer:*

0 to 10 inches—dark brown friable loam

*Subsoil:*

10 to 30 inches—dark gray and grayish brown friable loam

30 to 52 inches—light brownish gray and gray friable clay loam

*Substratum:*

52 to 60 inches—gray friable sandy loam

### **Soil Properties and Qualities**

*Drainage class:* Poorly drained

*Permeability:* Moderate or slow

*Available water capacity:* High

*Seasonal high water table:* At the surface or within a depth of 12 inches

*Flooding:* Frequent

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for

cultivated crops are the seasonal high water table and the flooding.

- The wetness delays planting and harvesting in most years.
- Crop species that have a short growing season and can tolerate wetness should be selected for planting.

### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the seasonal high water table and the flooding.
- Forage species that can tolerate the wetness and flooding grow best.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns are the equipment limitation, plant competition, and seedling mortality.
- Operating equipment when the soil is wet results in excessive rutting or miring.
- Equipment should be operated only when the soil is dry and after gravel or other suitable subgrade material has been added to the main roads.
- If possible, roads should be constructed in areas of nearby, better suited soils.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the seasonal high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Preparing the seedbed so that seedlings can be planted on ridges helps to overcome the wetness.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for wetland, openland, and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Buffer zones along streams provide food and cover for wildlife as well as control erosion.
- Establishing shallow water areas provides a water source for upland wildlife and promotes use of the area by waterfowl, shore birds, and other wetland wildlife.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- The flooding and the wetness are difficult to overcome.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 3w

## **BaE—Barfield-Rock outcrop complex, 10 to 40 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Low ridges and upland flats

*Size of areas:* 5 to 110 acres

*Major uses:* Pasture, hay, and woodland

### ***Composition***

Barfield soil and similar components: 70 to 80 percent

Rock outcrop: 15 to 25 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Lyerly soils

*Contrasting components:*

- Isolated areas of Capshaw, Colbert, and Collegedale soils
- Small areas of Tupelo soils on flood plains and in depressions

### ***Typical Profile***

#### **Barfield**

*Surface layer:*

0 to 6 inches—dark olive brown friable flaggy silty clay

*Subsoil:*

6 to 12 inches—olive brown firm flaggy clay

*Substratum:*

12 to 15 inches—olive brown firm flaggy clay that has dark yellowish brown mottles

*Bedrock:*

15 inches—hard limestone

**Rock outcrop**

Rock outcrop consists of exposed areas of limestone or dolomite and areas that have less than 2 or 3 inches of soil over bedrock. Most outcrops protrude from the surface a few inches to about 2 feet. Rock outcrop supports little or no vegetation.

***Properties and Qualities of the Barfield Soil***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Available water capacity:* Very low

*Soil reaction:* Slightly acid to slightly alkaline

*Depth to bedrock:* 8 to 20 inches

*Shrink-swell potential:* High

***Use and Management*****Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the shallow root zone and very low available water capacity of the Barfield soil, the Rock outcrop, and the slope.

**Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the Rock outcrop and the slope.
- The shallow root zone and very low available water capacity of the Barfield soil are additional limitations affecting the production of some forage species.
- The Rock outcrop and the slope increase the difficulty of properly managing pastures and limit the use of this map unit as hayland.

**Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, seedling mortality, the equipment limitation, and the hazard of windthrow.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by

spreading gravel on the road surface and installing water breaks and culverts.

- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth, the low available water capacity, and the Rock outcrop.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is poor.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock, shrink-swell potential, low soil strength, and moderately slow permeability in areas of the Barfield soil and the Rock outcrop.
- A suitable alternative site should be selected.

***Interpretive Group***

*Land capability classification:* 7s

**BEF—Bethesda-Mine pits complex,  
10 to 80 percent slopes*****Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Man-made benches and outslopes

*Size of areas:* 5 to 15 acres

*Major uses:* Idle land

***Composition***

Bethesda soil and similar components: 70 to 85 percent

Mine pits: 10 to 25 percent

Contrasting components: 5 to 20 percent

***Minor Components***

*Similar components:*

- Areas of soils that have shale bedrock at a depth of more than 40 inches
- Coal processing and loading facilities

*Contrasting components:*

- Small areas of Lily, Ramsey, Gilpin, and Sequoia soils that have not been disturbed

***Typical Profile*****Bethesda**

*Surface layer:*

0 to 2 inches—dark grayish brown friable channery loam

*Substratum:*

2 to 45 inches—brown friable very channery loam and clay loam

45 to 60 inches—yellowish brown friable flaggy loam

**Mine pits**

Mine pits are open excavations made to remove coal seams. A nearly vertical high wall bounds 1 to 3

sides of the excavation. Some areas are deep mines where a narrow bench is excavated and smoothed.

This bench serves as a place to locate a shaft or tunnel and equipment for underground mining operations. The excess excavated material is usually pushed toward the downslope side of the excavation. Also included are areas where coal is processed, stored, and loaded.

***Properties and Qualities of the Bethesda Soil***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Available water capacity:* Moderate

*Soil reaction:* Extremely acid to strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

***Use and Management*****Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the hazard of erosion and the slope.

**Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the moderately deep root zone, the moderate available water capacity, and the slope.

**Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.

- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is poor.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock, the differential settling, and the slope.
- The moderate depth to bedrock and the slope affect most building site developments and sanitary facilities.
- Differential settling can cause concrete footers and floors to crack and can cause damage to improperly constructed structures.
- A more suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 7s

## **Bm—Bloomingdale silty clay loam, frequently flooded**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains and depressions

*Size of areas:* 5 to 180 acres

*Slope range:* 0 to 2 percent

*Major uses:* Pasture, hay, and woodland

### **Composition**

Bloomingdale soil and similar components: 80 to 90 percent

Contrasting components: 10 to 20 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Cranmore and Ketona soils

*Contrasting components:*

- Scattered areas of Hamblen and Capshaw soils at the slightly higher elevations
- Areas of Rockdell soils

### **Typical Profile**

*Surface layer:*

0 to 6 inches—brown very friable silty clay loam

*Subsoil:*

6 to 21 inches—grayish brown friable clay that has strong brown mottles

21 to 42 inches—gray firm clay that has yellowish brown mottles

*Substratum:*

42 to 55 inches—greenish gray firm clay that has yellowish brown mottles

55 to 63 inches—gray firm clay that has yellowish brown mottles

63 to 72 inches—gray firm clay that has strong brown mottles

### **Soil Properties and Qualities**

*Drainage class:* Poorly drained

*Permeability:* Moderately slow or slow

*Available water capacity:* High

*Seasonal high water table:* At the surface or within a depth of 12 inches

*Flooding:* Frequent

*Soil reaction:* Moderately acid to slightly alkaline

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

## ***Use and Management***

### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the seasonal high water table and the flooding.
- The wetness delays planting and harvesting in most years.
- Crop species that have a short growing season and can tolerate wetness should be selected for planting.

### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the seasonal high water table and the flooding.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production.
- Forage species that can tolerate the wetness and flooding grow best.

### **Woodland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns are the equipment limitation, plant competition, and seedling mortality.
- Operating equipment when the soil is wet results in excessive rutting or miring.
- Equipment should be operated only when the soil is dry and after gravel or other suitable subgrade material has been added to the main roads.
- If possible, roads should be constructed in areas of nearby, better suited soils.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the seasonal high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Preparing the seedbed so that seedlings can be

planted on ridges helps to minimize seeding mortality.

- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for wetland wildlife habitat is good, and the potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Buffer zones along streams provide food and cover for wildlife as well as control erosion.
- Establishing shallow water areas provides a water source for upland wildlife and promotes use of the area by waterfowl, shore birds, and other wetland wildlife.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- The flooding and wetness are difficult to overcome.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 3w

## **CaB—Capshaw silt loam, 2 to 5 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Stream terraces and upland flats

*Size of areas:* 5 to 280 acres

*Major uses:* Pasture, hay, and woodland

### ***Composition***

Capshaw soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Colbert soils
- Areas of well drained soils

*Contrasting components:*

- Isolated areas of Conasauga and Lyerly soils

- Small areas of Bloomingdale soils along drainageways and in depressions
- Isolated areas of Barfield soils intermingled with limestone outcrops

### **Typical Profile**

#### *Surface layer:*

0 to 4 inches—brown friable silt loam

#### *Subsurface layer:*

4 to 9 inches—brown friable silty clay loam

#### *Subsoil:*

9 to 24 inches—brownish yellow firm silty clay loam

24 to 72 inches—brownish yellow firm clay and silty clay having gray and black mottles

#### *Bedrock:*

72 inches—soft shale

### **Soil Properties and Qualities**

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* High

*Seasonal high water table:* Between depths of 24 and 40 inches

*Soil reaction:* Strongly acid or moderately acid in the surface layer and the upper part of the subsoil; slightly acid to slightly alkaline in the lower part of the subsoil and in the substratum

*Depth to bedrock:* 40 to more than 72 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion and the wetness.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.

- Forage species that can tolerate the wetness grow best.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Trees and shrubs along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the wetness, the shrink-swell potential, the low soil

strength, and the clayey texture and slow permeability in the subsoil.

- Special measures are needed to help overcome subsurface drainage problems.
- This soil is best suited to dwellings without basements.
- The wetness, the slow permeability, and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 2e

## **CaC—Capshaw silt loam, 5 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Stream terraces and upland flats

*Size of areas:* 5 to 60 acres

*Major uses:* Pasture, hay, and woodland

### ***Composition***

Capshaw soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Colbert soils
- Areas of well drained soils

*Contrasting components:*

- Isolated areas of Conasauga and Lyerly soils
- Small areas of Bloomingdale soils along drainageways and in depressions
- Isolated areas of Barfield soils intermingled with limestone outcrops

### ***Typical Profile***

*Surface layer:*

0 to 4 inches—brown friable silt loam

*Subsurface layer:*

4 to 9 inches—brown friable silty clay loam

*Subsoil:*

9 to 24 inches—brownish yellow firm silty clay loam

24 to 72 inches—brownish yellow firm clay and silty clay having gray and black mottles

*Bedrock:*

72 inches—soft shale

### ***Soil Properties and Qualities***

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* High

*Seasonal high water table:* Between depths of 24 and 40 inches

*Soil reaction:* Strongly acid or moderately acid in the surface layer and the upper part of the subsoil; slightly acid to slightly alkaline in the lower part of the subsoil and in the substratum

*Depth to bedrock:* 40 to more than 72 inches

*Shrink-swell potential:* Moderate

### ***Use and Management***

#### ***Cropland***

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the erosion hazard and wetness.
- Erosion is a moderate hazard if a conventional tillage system is used.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### ***Pasture and hay***

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate the wetness grow best.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an

adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Trees and shrubs along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the wetness, the shrink-swell potential, the low soil strength, the slope, and the clayey texture and slow permeability in the subsoil.
- Special measures are needed to help overcome subsurface drainage problems.
- This soil is best suited to dwellings without basements.
- The wetness, the slow permeability, and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for

local roads and streets or if the soil is used as a source of roadfill.

- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## **Cb—Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Alluvial fans and stream terraces at the base of the Cumberland Plateau Escarpment

*Size of areas:* 35 to 245 acres

*Major uses:* Pasture and hay

### **Composition**

Cobstone soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Shady soils
- Areas of soils that flood frequently or occasionally

*Contrasting components:*

- Intermingled areas of Hamblen soils along drainageways
- Small areas of Allen and Bouldin soils on footslopes
- Isolated areas of Cranmore soils in depressions

### **Typical Profile**

*Surface layer:*

0 to 5 inches—dark grayish brown very friable cobbly fine sandy loam

*Subsurface layer:*

5 to 12 inches—strong brown very friable cobbly fine sandy loam

*Subsoil:*

12 to 28 inches—strong brown very friable extremely cobbly fine sandy clay loam

28 to 34 inches—strong brown very friable extremely cobbly fine sandy loam

34 to 63 inches—yellowish brown very friable extremely cobbly sandy loam

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Low

*Seasonal high water table:* At a depth of more than 60 inches

*Flooding:* Rare

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the low available water capacity and the cobbles.
- Cobbles in the surface layer may restrict tillage operations.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate droughty conditions grow best.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- Plant competition from undesirable species may be a problem when establishing a new forest crop.

- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the cobbly surface layer and low available water capacity.
- The amount of cobbles in the soil should be considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and the cobbles.
- The pebbles and cobbles throughout the soil cause problems in areas used for lawns and if the soil is landscaped or used as a source of topsoil material.
- This soil is generally unsuited to building sites because of the flooding potential.

### ***Interpretive Group***

*Land capability classification:* 6s

## **CDB—Cobstone-Shady-Urban land complex, 0 to 5 percent slopes, rarely flooded**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Footslopes, alluvial fans, and stream terraces

*Size of areas:* 20 to 370 acres

*Major uses:* Urban areas

### ***Composition***

Cobstone soil and similar components: 30 to 50 percent

Shady soil and similar components: 25 to 35 percent

Urban land: 15 to 25 percent

Contrasting components: 10 to 20 percent

### ***Minor Components***

*Similar components:*

- Areas of soils that flood frequently
- Intermingled areas of Holston and Etowah soils on landscapes similar to those of the Cobstone and Shady soils

*Contrasting components:*

- Scattered areas of Allen and Jefferson soils at the slightly higher elevations
- Isolated areas of Cranmore soils in depressions

### ***Typical Profile***

#### **Cobstone**

*Surface layer:*

0 to 5 inches—dark grayish brown very friable cobbly fine sandy loam

*Subsurface layer:*

5 to 12 inches—strong brown very friable cobbly fine sandy loam

*Subsoil:*

12 to 28 inches—strong brown very friable extremely cobbly fine sandy clay loam

28 to 34 inches—strong brown very friable extremely cobbly fine sandy loam

34 to 63 inches—yellowish brown very friable extremely cobbly sandy loam

#### **Shady**

*Surface layer:*

0 to 8 inches—dark yellowish brown very friable loam

*Subsoil:*

8 to 25 inches—strong brown friable clay loam

25 to 32 inches—strong brown friable sandy clay loam

32 to 42 inches—yellowish brown friable loam

42 to 72 inches—yellowish brown very friable very cobbly sandy loam

### **Urban land**

Urban land mostly consists of areas where the surface is covered by roads, streets, parking lots, commercial buildings, houses, and other types of impervious material. In places, the natural drainage pattern has been altered by a system of ditches and storm drains. The underlying soil material is not observable. A typical profile of Urban land is not given.

### ***Properties and Qualities of the Cobstone and Shady Soils***

*Drainage class:* Well drained

*Permeability:* Cobstone—moderately rapid; Shady—moderate

*Available water capacity:* Cobstone—low; Shady—high

*Seasonal high water table:* Cobstone—at a depth of more than 60 inches; Shady—between depths of 60 and 72 inches

*Flooding:* Rare; areas that presently do not flood had the potential for flooding before streams and drainage patterns were modified

*Soil reaction:* Cobstone—very strongly acid or strongly acid, except in limed areas; Shady—very strongly acid to moderately acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Urban development**

*Suitability:* Suited

Management measures and considerations follow.

*Site considerations:*

- The flooding is a major management concern in most areas.
- The load-bearing strength, surface runoff, and storm drainage management are additional concerns affecting urban development.

*Dwellings:*

- The guidelines and restrictions for building dwellings and small commercial buildings on flood plains should be followed.
- The soil material varies widely in areas of Urban land.

*Sanitary facilities:*

- This map unit commonly is not suitable as a site for onsite subsurface sewage disposal.
- In most places access to a municipal sewage disposal system is needed.

*Lawns and landscaping:*

- Providing a good seedbed, maintaining the proper fertility level, and mulching seeded areas help to establish ground cover.

*Small commercial buildings:*

- The guidelines and restrictions for building on flood plains should be followed.
- Differential settling is a management concern in some areas of fill material that are used as sites for small commercial buildings.
- Proper compaction of fill material minimizes differential settling.

*Local roads and streets:*

- Differential settling is a management concern in some areas of fill material that are used as areas for local roads and streets.
- Proper compaction of fill material minimizes differential settling.
- The low soil strength is a limitation affecting local roads and streets.
- Adding gravel or other suitable subgrade material helps to prevent the road damage caused by low soil strength.
- Onsite investigation is needed to determine the limitations affecting any proposed use.

***Interpretive Group***

*Land capability classification:* None assigned

## **CeC—Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky**

***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Low ridges and upland flats

*Size of areas:* 5 to several hundred acres

*Major uses:* Pasture, hay, and woodland

***Composition***

Colbert soil and similar components: 0 to 80 percent  
 Lyerly soil and similar components: 0 to 80 percent  
 Contrasting components: 5 to 15 percent

***Minor Components****Similar components:*

- Intermingled areas of Capshaw and Conasauga soils
- Small areas of well drained Collegedale soils

*Contrasting components:*

- Small areas of Barfield soils
- Small areas of Tupelo and Ketona soils along drainageways and in depressions

***Typical Profile*****Colbert***Surface layer:*

0 to 6 inches—dark yellowish brown friable silty clay loam

*Subsoil:*

6 to 26 inches—strong brown firm and very firm clay  
 26 to 36 inches—yellowish brown very firm clay that has gray mottles  
 36 to 46 inches—light olive brown very firm clay that has gray and red mottles

*Substratum:*

46 to 63 inches—light olive brown very firm clay that has gray and brown mottles

*Bedrock:*

63 inches—hard limestone

**Lyerly***Surface layer:*

0 to 4 inches—dark grayish brown friable silty clay loam

*Subsoil:*

4 to 22 inches—yellowish brown firm clay  
 22 to 28 inches—yellowish brown very firm clay that has gray mottles

*Bedrock:*

28 inches—hard limestone

***Soil Properties and Qualities***

*Drainage class:* Moderately well drained

*Permeability:* Very slow

*Available water capacity:* Colbert—moderate; Lyerly—low

*Seasonal high water table:* Colbert—between depths of 42 and 60 inches; Lyerly—between depths of 22 and 40 inches

*Soil reaction:* Colbert—strongly acid to slightly acid in the surface layer and in the upper part of the subsoil and slightly acid to slightly alkaline in the lower part of the subsoil and in the substratum;

Lyerly—strongly acid to slightly acid in the surface layer and the upper part of the subsoil and slightly acid to slightly alkaline in the lower part of the subsoil

*Depth to hard bedrock:* Colbert—40 to more than 72 inches; Lyerly—20 to 40 inches

*Shrink-swell potential:* High

### ***Use and Management***

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, rock outcrops, and the wetness in areas of the Lyerly soil.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Grassed waterways, field borders, and filter strips help to control erosion and runoff.
- Areas of rock outcrop increase the difficulty of properly managing cropland in this map unit.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate wetness should be selected for planting.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are rock outcrops and the low available water capacity of the Lyerly soil.
- Rock outcrops increase the difficulty of properly managing pastures and limit the use of this map unit as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns are plant competition, seedling mortality, and the hazard of windthrow.

- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the low available water capacity in areas of the Lyerly soil.
- Windthrow is a hazard in some areas of the Lyerly soil because of the moderately deep root zone.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife is good.
- The potential for woodland wildlife is good in areas of the Colbert soil and fair in areas of the Lyerly soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the shrink-swell potential, the very slow permeability, the clayey subsoil texture, the low soil strength, and rock outcrops.
- The moderate depth to bedrock and wetness in areas of the Lyerly soil are additional limitations affecting most sanitary facilities and building sites.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 4s

## **CgC—Collegedale silt loam, 2 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Upland ridgetops, shoulder slopes, and side slopes

*Size of areas:* 5 to 145 acres

*Major uses:* Hay, pasture, and cropland

### ***Composition***

Collegedale soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of Dewey, Waynesboro, and Capshaw soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways, in depressions, and on low terraces
- Scattered areas of Colbert and Lyerly soils
- Small areas of Talbott soils and rock outcrops

### ***Typical Profile***

*Surface layer:*

0 to 6 inches—brown friable silt loam

*Subsoil:*

6 to 32 inches—yellowish red very firm clay that has yellow and red mottles

32 to 53 inches—yellowish red very firm clay that has red, yellow, and brown mottles

53 to 80 inches—mottled red, brown, yellow, and gray very firm clay

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### ***Use and Management***

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.

- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Trees and shrubs along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.

- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability, clayey subsoil, low soil strength, shrink-swell potential, and slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 4e

## **CgD—Collegedale silt loam, 12 to 25 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Upland ridgetops, shoulder slopes, and side slopes

*Size of areas:* 5 to 120 acres

*Major uses:* Woodland, pasture, and hayland

### **Composition**

Collegedale soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Dewey, Waynesboro, and Capshaw soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways, in depressions, and on low terraces

- Scattered areas of Colbert and Lysterly soils
- Small areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 6 inches—brown friable silt loam

*Subsoil:*

6 to 32 inches—yellowish red very firm clay that has yellow and red mottles

32 to 53 inches—yellowish red very firm clay that has red, yellow, and brown mottles

53 to 80 inches—mottled red, brown, yellow, and gray very firm clay

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability:* Suited*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Well suited*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.

- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Poorly suited*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

***Interpretive Group****Land capability classification:* 6e**CoC—Conasauga silt loam, 5 to 12 percent slopes*****Setting****Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Dissected upland ridges and side slopes*Size of areas:* 15 to 320 acres*Major uses:* Pasture, hayland, and woodland***Composition***

Conasauga soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

***Minor Components****Similar components:*

- Areas of Capshaw soils at the lower elevations
- Isolated areas of Colbert and Lyerly soils in positions similar to those of the Conasauga soil
- Intermingled areas of Townley soils at the slightly higher elevations

*Contrasting components:*

- Small areas of Bloomingdale and Tupelo soils along drainageways
- Isolated areas of limestone rock outcrop

### **Typical Profile**

#### *Surface layer:*

0 to 4 inches—dark yellowish brown friable silt loam

#### *Subsoil:*

4 to 14 inches—yellowish brown firm clay that has brown mottles

14 to 20 inches—yellowish brown firm clay that has red and olive gray mottles

#### *Substratum:*

20 to 24 inches—light gray firm clay that has yellowish red mottles

24 to 34 inches—grayish brown firm clay that has yellowish brown and light gray mottles

#### *Soft bedrock:*

34 to 48 inches—soft shale with 30 percent clayey fine-earth material

### **Soil Properties and Qualities**

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Available water capacity:* Moderate

*Seasonal high water table:* Between depths of 14 and 40 inches in winter and early spring

*Soil reaction:* Extremely acid to slightly acid

*Depth to bedrock:* 20 to 40 inches to soft bedrock

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the moderately deep root zone, the moderate available water capacity, and the wetness.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The growth of some forage species is limited by the

moderately deep root zone and the moderate available water capacity.

- Forage species that can tolerate the wetness and flooding grow best.
- Deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the

slow permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, the wetness, and the depth to bedrock.

- The slow permeability in the subsoil, the clayey subsoil, and the shrink-swell potential are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The moderate depth to bedrock is a limitation affecting some building site developments.
- Special measures are needed to help overcome subsurface drainage problems.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 6e

## **Cr—Cranmore loam, 0 to 2 percent slopes, frequently flooded**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains and depressions

*Size of areas:* 5 to 55 acres

*Slope range:* 0 to 2 percent

*Major uses:* Pasture, hay, and woodland

### ***Composition***

Cranmore soil and similar components: 80 to 90 percent

Contrasting components: 10 to 20 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of soils that have less sand in the subsoil than the Cranmore soil
- Areas of somewhat poorly drained soils
- Small areas of Bloomingdale soils

*Contrasting components:*

- Intermingled areas of Cobstone, Hamblen, and Shady soils at the slightly higher elevations

### ***Typical Profile***

*Surface layer:*

0 to 5 inches—dark grayish brown very friable loam

*Subsoil:*

5 to 11 inches—dark grayish brown friable loam that has brownish yellow mottles

11 to 24 inches—gray friable loam that has yellowish red mottles

*Substratum:*

24 to 40 inches—gray friable loam

40 to 55 inches—olive gray friable loam

55 to 62 inches—olive gray friable loam that has greenish gray mottles

### ***Soil Properties and Qualities***

*Drainage class:* Poorly drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* At the surface or within a depth of 12 inches

*Flooding:* Frequent

*Soil reaction:* Moderately acid to slightly alkaline

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### ***Cropland***

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the seasonal high water table and the flooding.
- The wetness delays planting and harvesting in most years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.

#### ***Pasture and hay***

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the seasonal high water table and the flooding.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production.
- Forage species that can tolerate the wetness and flooding grow best.

#### ***Woodland***

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns are the equipment

limitation, plant competition, seedling mortality, and the hazard of windthrow.

- Operating equipment when the soil is wet results in excessive rutting or miring.
- Equipment should be operated only when the soil is dry and after gravel or other suitable subgrade material has been added to the main roads.
- If possible, roads should be constructed in areas of nearby, better suited soils.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the seasonal high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Preparing the seedbed so that seedlings can be planted on ridges helps to minimize seedling mortality.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for wetland wildlife habitat is good, and the potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Buffer zones along streams provide food and cover for wildlife as well as control erosion.
- Establishing shallow water areas provides a water source for upland wildlife and promotes use of the area by waterfowl, shore birds, and other wetland wildlife.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- The flooding and wetness are difficult to overcome.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 3w

## **DeB—Dewey silt loam, 2 to 5 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Upland ridgetops

*Size of areas:* 5 to 55 acres

*Major uses:* Hay, pasture, and cropland

### **Composition**

Dewey soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Etowah, Fullerton, Minvale, and Waynesboro soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 9 inches—dark reddish brown very friable silt loam

*Subsoil:*

9 to 35 inches—red friable clay

35 to 61 inches—red friable clay that has strong brown and reddish yellow mottles

61 to 72 inches—yellowish red friable clay that has reddish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid to slightly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control

erosion, increase the rate of water infiltration, and maintain soil tilth.

- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the slope.
- The moderate permeability, the shrink-swell potential, and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 2e

## **DeC—Dewey silt loam, 5 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Upland ridgetops and side slopes

*Size of areas:* 5 to 140 acres

*Major uses:* Hay, pasture, and cropland

### ***Composition***

Dewey soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Etowah, Fullerton, Minvale, and Waynesboro soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### ***Typical Profile***

*Surface layer:*

0 to 9 inches—dark reddish brown very friable silt loam

*Subsoil:*

9 to 35 inches—red friable clay

35 to 61 inches—red friable clay that has strong brown and reddish yellow mottles

61 to 72 inches—yellowish red friable clay that has reddish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid to slightly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the slope.
- The moderate permeability, the shrink-swell potential, and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## **DeD—Dewey silt loam, 12 to 25 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Narrow upland ridgetops and side slopes

*Size of areas:* 5 to 80 acres

*Major uses:* Hay, pasture, and cultivated crops

### **Composition**

Dewey soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Etowah, Fullerton, Minvale, and Waynesboro soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 9 inches—dark reddish brown very friable silt loam

*Subsoil:*

9 to 35 inches—red friable clay

35 to 61 inches—red friable clay that has strong brown and reddish yellow mottles

61 to 72 inches—yellowish red friable clay that has reddish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid to slightly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.

- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the slope.
- The moderate permeability, the shrink-swell potential, and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 4e

## **DL—Dumps, landfills**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Uplands

*Size of area:* About 50 acres

*Slope range:* 10 to 80 percent

*Major uses:* Storage and disposal of domestic waste

### **Composition**

Dumps, landfills, and similar components: 70 to 90 percent

Contrasting components: 10 to 30 percent

### **Minor Components**

*Similar components:*

- Udorthents in similar landscape positions

*Contrasting components:*

- Hamblen and Rockdell soils along drainageways and on narrow flood plains
- Scattered areas of Fullerton and Dewey soils

### **Typical Profile**

A typical profile is not given for this map unit.

### **Soil Properties and Qualities**

The soil materials in this map unit are disturbed and vary greatly. In most areas the original soil material was removed and stockpiled to create a place where domestic solid waste could be disposed. The stockpiled soil material was then used to cover the deposited waste material. An onsite investigation is needed to determine the limitations affecting any proposed use.

### **Use and Management**

- The hazard of erosion is the major management concern.
- A well designed erosion-control plan is needed.
- Erosion barriers, diversions, and rock-lined or vegetated waterways are important management practices.
- Timely establishment of vegetation in inactive areas should be a priority.
- Plant species that can tolerate a wide range of soil conditions grow best.
- Providing a good seedbed, maintaining the proper fertility level, and mulching seeded areas help to establish a protective cover of vegetation.
- Intensive measures to establish vegetation, such as hydroseeding or sodding, may be needed in problem areas.
- A layer of coarse gravel, gabion stone, or riprap helps to control erosion in areas where vegetation cannot be established.

### **Interpretive Group**

*Land capability classification:* None assigned

## **Ec—Ealy-Craigsville complex, occasionally flooded**

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Flood plains and alluvial fans

*Size of areas:* 5 to 215 acres



Figure 8.—Picnic grounds in an area of Ealy-Craigsville complex, occasionally flooded, along the Piney River.

*Slope range:* 0 to 5 percent

*Major uses:* Woodland and some cropland (fig. 8)

### ***Composition***

Ealy soil and similar components: 50 to 65 percent

Craigsville soil and similar components: 25 to 40 percent

Contrasting components: 10 to 20 percent

### ***Minor Components***

*Similar components:*

- Low-lying areas of Ealy and Craigsville soils that flood frequently
- Areas of Pope and Philo soils in landscape positions similar to those of the major soils

*Contrasting components:*

- Areas of Allegheny and Cotaco soils on stream terraces and alluvial fans
- Areas of Jefferson, Shelocta, and Varilla soils on footslopes

### ***Typical Profile***

**Ealy**

*Surface layer:*

0 to 3 inches—brown very friable fine sandy loam

3 to 10 inches—dark yellowish brown very friable fine sandy loam

*Subsoil:*

10 to 39 inches—dark yellowish brown very friable fine sandy loam

*Substratum:*

39 to 60 inches—dark yellowish brown very friable loam and fine sandy loam

**Craigsville***Surface layer:*

0 to 3 inches—dark brown very friable cobbly fine sandy loam

*Subsoil:*

3 to 9 inches—brown friable cobbly sandy loam

9 to 21 inches—dark yellowish brown friable very cobbly sandy loam

*Substratum:*

21 to 60 inches—dark yellowish brown and yellowish brown loose extremely cobbly loamy sand

**Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Ealy—high; Craigsville—low

*Seasonal high water table:* Ealy—between depths of 60 and 72 inches; Craigsville—at a depth of more than 60 inches

*Flooding:* Occasional

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

**Use and Management****Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the stones and cobbles on and in the soil surface layer and the flooding.
- Some crops may be damaged by the flooding in winter and early spring.
- The stones and cobbles on and in the surface layer of the Craigsville soil restrict tillage.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

**Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The stones and cobbles on and in the surface layer of the Craigsville soil increase the difficulty of properly managing pastures and limit the use of this soil as hayland.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.

- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the cobbles in the surface layer and a low available water capacity in areas of the Craigsville soil.
- Stones and cobbles on the soil surface and in the soil should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is good in areas of the Ealy soil and fair in areas of the Craigsville soil.
- The potential for woodland wildlife habitat is good in areas of the Ealy soil and fair in areas of the Craigsville soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation affecting urban uses is the flooding.
- The stones and cobbles in areas of the Craigsville soil also cause problems for lawns and create limitations if the soil is landscaped or used as a source of topsoil material.
- The flooding limitation is difficult to overcome.
- A suitable alternative site should be selected.

**Interpretive Group***Land capability classification:* 3s**Eg—Egam silty clay loam, 0 to 3 percent slopes****Setting***Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Low stream terraces*Size of areas:* 5 to 60 acres*Major uses:* Cropland, pasture, and hay**Composition**

Egam soil and similar components: 85 to 95 percent  
 Contrasting components: 5 to 15 percent

**Minor Components***Similar components:*

- Areas of Tupelo and Wolftever soils in landscape positions similar to those of the Egam soil
- Areas of Staser soils on natural levees
- Small areas of soils that have steeper slopes; near tributary streams and on streambanks

*Contrasting components:*

- Intermingled areas of Altavista soils at the slightly higher elevations
- Small areas of Bloomingdale soils in depressions and along drainageways

**Typical Profile***Surface layer:*

0 to 8 inches—dark brown friable silty clay loam

*Subsurface layer:*

8 to 24 inches—very dark grayish brown firm silty clay loam

*Subsoil:*

24 to 35 inches—dark yellowish brown firm silty clay that has brownish mottles

35 to 49 inches—brown firm clay that has brownish mottles

*Substratum:*

49 to 63 inches—dark yellowish brown firm clay that has grayish mottles

63 to 72 inches—dark yellowish brown firm clay that has grayish and brownish mottles

**Soil Properties and Qualities***Drainage class:* Moderately well drained*Permeability:* Moderately slow*Available water capacity:* High*Seasonal high water table:* Between depths of 24 to 40 inches*Flooding:* None; most areas are protected from flooding by Watts Bar Dam*Soil reaction:* Neutral to moderately acid*Depth to bedrock:* More than 60 inches*Shrink-swell potential:* Moderate**Use and Management****Cropland***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- The wetness delays planting and harvesting in some years.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

**Pasture and hay***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting forestland management.

- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the seasonal water table.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the wetness, the clayey subsoil, the shrink-swell potential, and the moderately slow permeability in the subsoil.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- A more suitable alternative site should be considered.

### **Interpretive Group**

*Land capability classification:* 1

## **EtB—Etowah loam, 2 to 5 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Stream terraces and footslopes

*Size of areas:* 5 to 200 acres

*Major uses:* Hay, pasture, and cropland

### **Composition**

Etowah soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Dewey, Holston, and Waynesboro soils
- A few areas of Altavista soils
- Intermingled areas of Shady soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions

### **Typical Profile**

*Surface layer:*

0 to 7 inches—dark brown friable silt loam

*Subsoil:*

7 to 38 inches—yellowish red friable silty clay loam

38 to 70 inches—strong brown friable silty clay loam

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid to moderately acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

**Pasture and hay***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Well suited*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting urban uses.
- The moderate permeability in the subsoil is a

limitation affecting some sanitary facilities and building site developments.

- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

**Interpretive Group***Land capability classification:* 2e**EtC—Etowah loam, 5 to 12 percent slopes****Setting***Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Stream terraces*Size of areas:* 5 to 65 acres*Major uses:* Hay, pasture, and cropland**Composition**

Etowah soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

**Minor Components***Similar components:*

- Scattered areas of Dewey, Holston, and Waynesboro soils
- A few areas of Altavista soils
- Intermingled areas of Shady soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions

**Typical Profile***Surface layer:*

0 to 7 inches—dark brown friable silt loam

*Subsoil:*

7 to 38 inches—yellowish red friable silty clay loam

38 to 70 inches—strong brown friable silty clay loam

**Soil Properties and Qualities***Drainage class:* Well drained*Permeability:* Moderate*Available water capacity:* High*Soil reaction:* Very strongly acid to moderately acid*Depth to bedrock:* More than 60 inches*Shrink-swell potential:* Low

## ***Use and Management***

### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence

rows can break up large, open areas and provide food and cover to wildlife.

- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the low soil strength, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 3e

## **FuB—Fullerton gravelly silt loam, 2 to 5 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Ridge crests

*Size of areas:* 5 to 20 acres

*Major uses:* Cropland, pasture, and hay

### ***Composition***

Fullerton soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Etowah, Dewey, Minvale, and Waynesboro soils

*Contrasting components:*

- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

#### *Surface layer:*

0 to 7 inches—dark yellowish brown very friable  
gravelly silt loam

#### *Subsurface layer:*

7 to 15 inches—brownish yellow very friable very  
gravelly loam

#### *Subsoil:*

15 to 30 inches—yellowish red friable gravelly clay

30 to 65 inches—red friable gravelly clay that has  
brownish yellow mottles

65 to 72 inches—red firm very gravelly clay that has  
brownish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and improve soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.

- Plant competition from undesirable species may be problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the shrink-swell potential.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 2e

## FuC—Fullerton gravelly silt loam, 5 to 12 percent slopes

### Setting

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Ridge crests and shoulder slopes

*Size of areas:* 5 to 300 acres

*Major uses:* Cropland, pasture, and hay

### Composition

Fullerton soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

### Minor Components

*Similar components:*

- Intermingled areas of Etowah, Dewey, Minvale, and Waynesboro soils

*Contrasting components:*

- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### Typical Profile

*Surface layer:*

0 to 7 inches—dark yellowish brown very friable gravelly silt loam

*Subsurface layer:*

7 to 15 inches—brownish yellow very friable very gravelly loam

*Subsoil:*

15 to 30 inches—yellowish red friable gravelly clay  
30 to 65 inches—red friable gravelly clay that has brownish yellow mottles

65 to 72 inches—red firm very gravelly clay that has brownish yellow mottles

### Soil Properties and Qualities

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### Use and Management

#### Cropland

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.

- Erosion is a moderate hazard if a conventional tillage system is used.
- The gravelly surface layer restricts tillage in some areas.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### Pasture and hay

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture.
- The slope may be a limitation affecting hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### Woodland

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### Wildlife habitat

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.

- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting some urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## **FuD—Fullerton gravelly silt loam, 12 to 25 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Ridge crests, shoulder slopes, and side slopes

*Size of areas:* 5 to 360 acres

*Major uses:* Pasture, hay, and woodland

### **Composition**

Fullerton soil and similar components: 80 to 90 percent

Contrasting components: 10 to 20 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Etowah, Dewey, Minvale, and Waynesboro soils

*Contrasting components:*

- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 7 inches—dark yellowish brown very friable gravelly silt loam

*Subsurface layer:*

7 to 15 inches—brownish yellow very friable very gravelly loam

*Subsoil:*

15 to 30 inches—yellowish red friable gravelly clay

30 to 65 inches—red friable gravelly clay that has brownish yellow mottles

65 to 72 inches—red firm very gravelly clay that has brownish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.
- The gravelly surface layer restricts tillage in some areas.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability: Suited**Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity and the gravelly surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability: Suited**Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability: Poorly suited**Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

***Interpretive Group****Land capability classification: 4e***FuF—Fullerton gravelly silt loam, 25 to 60 percent slopes*****Setting****Physiographic area: Southern Appalachian Ridges and Valleys**Landscape position: Side slopes and backslopes*

*Size of areas:* 5 to 360 acres

*Major uses:* Woodland

### **Composition**

Fullerton soil and similar components: 75 to 95 percent

Contrasting components: 5 to 25 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Etowah, Dewey, Minvale, and Waynesboro soils

*Contrasting components:*

- Scattered areas of Pailo soils
- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 7 inches—dark yellowish brown very friable gravelly silt loam

*Subsurface layer:*

7 to 15 inches—brownish yellow very friable very gravelly loam

*Subsoil:*

15 to 30 inches—yellowish red friable gravelly clay

30 to 65 inches—red friable gravelly clay that has brownish yellow mottles

65 to 72 inches—red firm very gravelly clay that has brownish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- The slope prevents the use of most tillage equipment.

#### **Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly

managing pastures and limits the use of this soil as hayland.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity and the gravelly surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.

- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, and the slope.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 7e

### **GpC—Gilpin loam, 5 to 12 percent slopes**

#### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Ridge crests and shoulder slopes

*Size of areas:* 5 to 345 acres

*Major uses:* Woodland, hay, and pasture

#### **Composition**

Gilpin soil and similar components: 90 to 95 percent

Contrasting components: 5 to 10 percent

#### **Minor Components**

*Similar components:*

- Scattered areas of Lily and Lonewood soils
- Areas of Sequoia soils

*Contrasting components:*

- Intermingled areas of Petros soils
- Isolated areas of sandstone or shale rock outcrops

#### **Typical Profile**

*Surface layer:*

0 to 1 inch—brown very friable loam

*Subsoil:*

1 to 5 inches—yellowish brown friable loam

5 to 34 inches—yellowish brown friable channery silty clay loam

*Substratum:*

34 to 38 inches—yellowish brown firm channery silty clay

*Bedrock:*

38 to 50 inches—soft multicolored mudstone

#### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

#### **Use and Management**

##### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- In addition, the moderate available water capacity and the moderately deep root zone may limit the production of some crop species.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

##### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate a moderately deep root zone and can withstand occasional droughtiness are best suited to this soil.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

##### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.

- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is good, and the potential for woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation affecting urban uses is the depth to bedrock.
- The moderate depth to bedrock affects most building site developments and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome the depth to bedrock.

### **Interpretive Group**

*Land capability classification:* 3e

## **GpD—Gilpin loam, 12 to 20 percent slopes**

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Shoulder slopes and side slopes

*Size of areas:* 5 to 590 acres

*Major uses:* Woodland

### **Composition**

Gilpin soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Lily and Lonewood soils
- Areas of Sequoia soils

*Contrasting components:*

- Intermingled areas of Petros soils
- Small areas of Shelocta and Jefferson soils on the lower side slopes

### **Typical Profile**

*Surface layer:*

0 to 1 inch—brown very friable loam

*Subsoil:*

1 to 5 inches—yellowish brown friable loam

5 to 34 inches—yellowish brown channery friable silty clay loam

*Substratum:*

34 to 38 inches—yellowish brown firm channery silty clay

*Bedrock:*

38 to 50 inches—soft multicolored mudstone

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- In addition, the moderate available water capacity and the moderately deep root zone may limit the production of some crop species.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.

- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderately deep root zone, the moderate available water capacity, and the slope.
- Forage species that can tolerate a moderately deep root zone and can withstand occasional droughtiness are best suited to this soil.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling

mortality rate may be high because of the moderate available water capacity.

- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock and the slope.
- The moderate depth to bedrock and the slope affect most building site developments and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 4e

## **GpF—Gilpin loam, 20 to 60 percent slopes**

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes

*Size of areas:* 5 to 570 acres

*Major uses:* Woodland

### **Composition**

Gilpin soil and similar components: 80 to 90 percent

Contrasting components: 10 to 20 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Sequoia soils

*Contrasting components:*

- Intermingled areas of Petros soils
- Small areas of Shelocta and Jefferson soils on the lower parts of side slopes and near drainageways

### **Typical Profile**

*Surface layer:*

0 to 1 inch—dark grayish brown very friable loam

*Subsoil:*

1 to 5 inches—yellowish brown friable loam

5 to 34 inches—yellowish brown friable channery silty clay loam

*Substratum:*

34 to 38 inches—yellowish brown firm channery silty clay

*Bedrock:*

38 to 50 inches—soft multicolored mudstone

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* Moderate

*Flooding:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the hazard of erosion and the slope.

#### **Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the moderately deep root zone, the moderate available water capacity, and the slope.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.

- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### Urban development

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock and the slope.
- The moderate depth to bedrock and the slope affect most building site developments and sanitary facilities.
- A more suitable alternative site should be selected.

### Interpretive Group

*Land capability classification:* 7e

## GuF—Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony

### Setting

*Physiographic area:* Escarpment of the Cumberland Plateau

*Landscape position:* Side slopes, backslopes, and footslopes

*Size of areas:* 5 to several hundred acres

*Major uses:* Woodland and wildlife habitat (fig. 9)

### Composition

Gilpin soil and similar components: 25 to 45 percent

Bouldin soil and similar components: 30 to 45 percent

Petros soil and similar components: 15 to 25 percent

Contrasting components: 10 to 20 percent

### Minor Components

*Similar components:*

- Soils that have shale bedrock at a depth of more than 40 inches
- Intermingled areas of Sequoia soils

*Contrasting components:*

- Isolated areas of sandstone and shale rock outcrops
- Areas of Shelocta, Jefferson, and Varilla soils on the lower side slopes, on footslopes, and along drainageways

### Typical Profile

#### Gilpin

*Surface layer:*

0 to 1 inch—dark grayish brown very friable loam

*Subsoil:*

1 to 5 inches—yellowish brown friable loam

5 to 34 inches—yellowish brown friable channery silty clay loam

*Substratum:*

34 to 38 inches—yellowish brown firm channery silty clay

*Bedrock:*

38 to 50 inches—soft multicolored mudstone

#### Bouldin

*Surface layer:*

0 to 2 inches—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

2 to 6 inches—yellowish brown very friable cobbly loam

*Subsoil:*

6 to 16 inches—strong brown very friable very cobbly loam

16 to 40 inches—strong brown friable very cobbly clay loam

40 to 64 inches—yellowish red firm extremely gravelly clay loam

64 to 80 inches—brownish, yellowish, and reddish firm cobbly loam

#### Petros

*Surface layer:*

0 to 1 inch—dark grayish brown very friable channery silt loam

*Subsoil:*

1 to 16 inches—yellowish brown friable extremely channery silt loam

*Bedrock:*

16 inches—rippable shale

### Soil Properties and Qualities

*Drainage class:* Gilpin and Bouldin—well drained; Petros—excessively drained

*Permeability:* Gilpin—moderate; Bouldin—moderately rapid; Petros—moderate or moderately rapid

*Available water capacity:* Gilpin and Bouldin—moderate; Petros—very low

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Gilpin—20 to 40 inches; Bouldin—



Figure 9.—Woodland and wildlife habitat are the major uses for Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony. The slope limits this map unit for most other uses.

more than 60 inches; Petros—10 to 20 inches to soft bedrock

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the hazard of erosion and the slope.
- Stones on the soil surface and depth to bedrock in areas of the Petros soil are additional limitations.

#### **Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the shallow root zone and very low available water capacity in areas of the Petros soil, the moderately deep root zone and the moderate available water capacity in areas of the

Gilpin soil, the moderate available water capacity in areas of the Bouldin soil, and the slope.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of windthrow is an additional concern in areas of the Petros soil.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.

- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone of the Petros soil.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is fair in areas of Gilpin and Bouldin soils.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock in areas of the Gilpin and Petros

soils, the slippage potential in areas of the Bouldin soil, and the slope.

- The shallow and moderate depth to bedrock, the slippage potential, and the slope affect most building site developments and sanitary facilities.
- A more suitable alternative site should be selected.

#### ***Interpretive Group***

*Land capability classification:* 7s

### **Ha—Hamblen silt loam, occasionally flooded**

#### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains and drainageways

*Size of areas:* 5 to 565 acres

*Slope range:* 0 to 3 percent

*Major uses:* Cropland, pasture, and hay

#### ***Composition***

Hamblen soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

#### ***Minor Components***

*Similar components:*

- Scattered areas of Etowah and Shady soils on stream terraces
- Intermingled areas that have more silt in the subsoil than the Hamblen soil; in similar positions

*Contrasting components:*

- Intermingled areas of Altavista soils
- Isolated areas of Cranmore and Bloomingdale soils in depressions

#### ***Typical Profile***

*Surface layer:*

0 to 5 inches—dark yellowish brown very friable silt loam

*Subsoil:*

5 to 22 inches—yellowish brown very friable silt loam

22 to 43 inches—yellowish brown very friable fine sandy loam that has light brownish gray and yellowish red mottles

*Substratum:*

43 to 62 inches—light yellowish brown very friable sandy loam that has light brownish gray and yellowish red mottles

### **Soil Properties and Qualities**

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* Between depths of 24 and 40 inches

*Flooding:* Occasional

*Soil reaction:* Very strongly acid to neutral

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- The wetness delays planting and harvesting in some years.
- Some crops may be damaged by flooding in winter and early spring.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- When establishing a new forest crop, the seedling mortality rate may be high because of the high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.

- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- The flooding and wetness are difficult to overcome.
- A suitable alternative site should be selected.

### **Interpretive Group**

*Land capability classification:* 2w

## **HoB—Holston loam, 2 to 5 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Stream terraces and footslopes

*Size of areas:* 5 to 105 acres

*Major uses:* Hay, pasture, and cropland

### **Composition**

Holston soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

#### *Similar components:*

- Scattered areas of Dewey and Waynesboro soils
- Areas of Etowah and Shady soils on landscapes similar to those of the Holston soil
- Intermingled areas of Altavista soils at the slightly lower elevations and in slight depressions
- Intermingled areas of very gravelly or very cobbly soils

#### *Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions that flood
- Scattered areas of Wolftever soils at the slightly lower elevations

### **Typical Profile**

#### *Surface layer:*

0 to 6 inches—dark yellowish brown very friable loam

#### *Subsoil:*

6 to 23 inches—strong brown friable clay loam

23 to 72 inches—strong brown friable clay loam that has yellowish brown mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.

- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

#### *Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This soil has few limitations affecting urban uses.
- The moderate permeability in the subsoil is a limitation affecting some sanitary facilities.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 2e

## HoC—Holston loam, 5 to 12 percent slopes

### Setting

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Stream terraces

*Size of areas:* 5 to 180 acres

*Major uses:* Hay, pasture, and cropland

### Composition

Holston soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### Minor Components

*Similar components:*

- Scattered areas of Dewey and Waynesboro soils
- Areas of Etowah and Shady soils on landscapes similar to those of the Holston soil
- Intermingled areas of Altavista soils at the slightly lower elevations and in slight depressions
- Intermingled areas of very gravelly or very cobbly soils

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions that flood
- Scattered areas of Wolftever soils at the slightly lower elevations

### Typical Profile

*Surface layer:*

0 to 6 inches—dark yellowish brown very friable loam

*Subsoil:*

6 to 23 inches—strong brown friable clay loam

23 to 72 inches—strong brown friable clay loam that has yellowish brown mottles

### Soil Properties and Qualities

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid, except in limed areas

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### Use and Management

#### Cropland

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.

- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### Pasture and hay

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### Woodland

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### Wildlife habitat

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.

- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability and the slope.
- The moderate permeability in the subsoil is a limitation affecting some sanitary facilities.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## **JeC—Jefferson cobbly loam, 5 to 12 percent slopes**

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Lower side slopes and footslopes

*Size of areas:* 5 to 190 acres

*Major uses:* Woodland and pasture

### **Composition**

Jefferson soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Areas that have fewer rock fragments in the surface layer than the Jefferson soil
- Scattered areas of Shelocta soils
- Areas of soils that have more clay in the subsoil than the Jefferson soil

*Contrasting components:*

- Intermingled areas of Lily and Gilpin soils
- Isolated areas of rock outcrops
- Scattered areas of Varilla soils along drainageways

### **Typical Profile**

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam

40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 60 inches—yellowish brown friable very gravelly sand loam

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- In addition, cobbles in the surface layer may hinder tillage operations.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.

- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the cobbles in the soil and the slope.
- The cobbles and stones throughout the soil may cause problems in areas used for lawns or as sites for sanitary facilities or if the soil is landscaped or excavated.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

#### ***Interpretive Group***

*Land capability classification:* 4s

### **JsD—Jefferson-Shelocta complex, 10 to 20 percent slopes**

#### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes and footslopes

*Size of areas:* 5 to 135 acres

*Major uses:* Woodland

#### ***Composition***

Jefferson soil and similar components: 45 to 65 percent

Shelocta soil and similar components: 30 to 50 percent

Contrasting components: 5 to 25 percent

#### ***Minor Components***

*Similar components:*

- Areas that have fewer rock fragments in the surface layer than the Jefferson and Shelocta soils
- Areas of soils that have more clay in the subsoil than the Jefferson and Shelocta soils

*Contrasting components:*

- Intermingled areas of Lily and Gilpin soils
- Isolated areas of rock outcrops
- Scattered areas of Varilla soils along drainageways

#### ***Typical Profile***

##### **Jefferson**

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam

40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 60 inches—yellowish brown friable very gravelly sandy loam

##### **Shelocta**

*Surface layer:*

0 to 1 inch—dark brown very friable loam

*Subsurface layer:*

1 to 3 inches—yellowish brown very friable loam

*Subsoil:*

3 to 11 inches—yellowish brown very friable loam

11 to 40 inches—yellowish brown friable silty clay loam

40 to 50 inches—brownish yellow firm channery silty clay loam

*Substratum:*

50 to 60 inches—soft multicolored shale bedrock

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Jefferson—moderately rapid; Shelocta—moderate

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Jefferson—more than 60 inches; Shelocta—more than 48 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the stones in the surface layer and on the soil surface, and the slope.

#### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of these soils as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.

- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity and the stony surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitation affecting urban uses is the slope.
- Proper design, installation, and site preparation help to overcome this limitation.

### **Interpretive Group**

*Land capability classification:* 6s

## **JsF—Jefferson-Shelocta complex, 20 to 45 percent slopes**

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes and footslopes

*Size of areas:* 10 to 130 acres

*Major uses:* Woodland

### ***Composition***

Jefferson soil and similar components: 45 to 65 percent

Shelocta soil and similar components: 30 to 40 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of Varilla soils
- Intermingled areas of soils that have more clay in the subsoil than the Jefferson and Shelocta soils

*Contrasting components:*

- Isolated areas of rock outcrops
- Intermingled areas of Gilpin, Lily, and Ramsey soils

### ***Typical Profile***

#### **Jefferson**

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam

40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 60 inches—yellowish brown friable very gravelly sandy loam

#### **Shelocta**

*Surface layer:*

0 to 1 inch—dark brown very friable loam

*Subsurface layer:*

1 to 3 inches—yellowish brown very friable loam

*Subsoil:*

3 to 11 inches—yellowish brown very friable loam

11 to 40 inches—yellowish brown friable silty clay loam

40 to 50 inches—brownish yellow firm channery silty clay loam

*Substratum:*

50 to 60 inches—soft multicolored shale bedrock

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Jefferson—moderately rapid; Shelocta—moderate

*Available water capacity:* Jefferson—moderate; Shelocta—high

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Jefferson—more than 60 inches; Shelocta—more than 48 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion and the slope.

#### **Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of these soils as pasture and hayland.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that

have smoother slopes and seedlings can be planted by hand.

- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity and the stony surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitation affecting urban uses is the slope.
- Proper design, installation, and site preparation help to overcome this limitation.

#### **Interpretive Group**

*Land capability classification:* 7s

### **JvD—Jefferson-Varilla-Shelocta complex, 10 to 20 percent slopes, very stony**

#### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Footslopes and alluvial fans

*Size of areas:* 5 to 95 acres

*Major uses:* Woodland

#### **Composition**

Jefferson soil and similar components: 45 to 55 percent

Varilla soil and similar components: 10 to 25 percent

Shelocta soil and similar components: 10 to 20 percent

Contrasting components: 5 to 30 percent

#### **Minor Components**

*Similar components:*

- Intermingled areas of soils that have more clay in the subsoil than the major soils

*Contrasting components:*

- Isolated areas of rock outcrops
- Scattered areas of Gilpin, Lily, and Ramsey soils

#### **Typical Profile**

##### **Jefferson**

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam  
40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 60 inches—yellowish brown friable very gravelly sandy loam

##### **Varilla**

*Surface layer:*

0 to 1 inch—very dark grayish brown very friable very cobbly sandy loam

*Subsoil:*

1 to 7 inches—brown very friable very cobbly sandy loam

7 to 44 inches—dark yellowish brown very friable very cobbly sandy loam

*Substratum:*

44 to 60 inches—yellowish brown loose very cobbly sandy loam

##### **Shelocta**

*Surface layer:*

0 to 1 inch—dark brown very friable loam

*Subsurface layer:*

1 to 3 inches—yellowish brown very friable loam

**Subsoil:**

3 to 11 inches—yellowish brown very friable loam

11 to 40 inches—yellowish brown friable silty clay loam

40 to 50 inches—brownish yellow firm channery silty clay loam

**Substratum:**

50 to 60 inches—soft multicolored shale bedrock

**Soil Properties and Qualities**

**Drainage class:** Jefferson and Shelocta—well drained;

Varilla—somewhat excessively drained

**Permeability:** Jefferson and Varilla—moderately rapid;

Shelocta—moderate

**Available water capacity:** Jefferson—moderate;

Varilla—low; Shelocta—high

**Soil reaction:** Very strongly acid or strongly acid

**Depth to bedrock:** Jefferson—more than 60 inches;

Varilla and Shelocta—more than 48 inches

**Shrink-swell potential:** Low

**Use and Management****Cropland**

**Suitability:** Unsited

**Management measures and considerations:**

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the stones in the surface layer and on the soil surface, and the slope.
- In addition, the low available water capacity in areas of the Varilla soil is a limitation.

**Pasture and hay**

**Suitability:** Poorly suited

**Management measures and considerations:**

- The main limitations are the low available water capacity in areas of the Varilla soil, the slope, and the stones on the surface.
- The slope and the stones on the surface increase the difficulty of properly managing pastures and limit the use of these soils as hayland.

**Woodland**

**Suitability:** Suited

**Management measures and considerations:**

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.

- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity in areas of the Jefferson and Shelocta soils, the low available water capacity in areas of the Varilla soil, and the stony surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

**Suitability:** Suited

**Management measures and considerations:**

- The potential for woodland wildlife habitat is good and the potential for openland wildlife habitat is fair in areas of the Jefferson and Shelocta soils.
- The potential for woodland wildlife is fair in areas of the Varilla soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development**

**Suitability:** Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the stones on the surface and the slope.
- In addition, areas of the Varilla soil may provide a poor filter for septic tank absorption fields.
- The stones on the surface and cobbles throughout the soil in areas of the Varilla soil may cause problems for lawns or sites for sanitary facilities or where the soil is landscaped or excavated.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

**Interpretive Group**

*Land capability classification:* 6s

## **JvF—Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony**

**Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Lower side slopes and footslopes

*Size of areas:* 5 to 885 acres

*Major uses:* Woodland

**Composition**

Jefferson soil and similar components: 45 to 55 percent

Varilla soil and similar components: 15 to 25 percent

Shelocta soil and similar components: 10 to 20 percent

Contrasting components: 5 to 30 percent

**Minor Components***Similar components:*

- Intermingled areas of soils that have more clay in the subsoil than the major soils

*Contrasting components:*

- Isolated areas of rock outcrops
- Scattered areas of Gilpin, Lily, and Ramsey soils

**Typical Profile****Jefferson***Surface layer:*

0 to 1 inch—very dark grayish brown very friable cobbly loam

*Subsurface layer:*

1 to 7 inches—yellowish brown friable cobbly loam

*Subsoil:*

7 to 40 inches—yellowish brown friable cobbly loam

40 to 56 inches—yellowish brown friable very cobbly clay loam

*Substratum:*

56 to 60 inches—yellowish brown friable very gravelly sandy loam

**Varilla***Surface layer:*

0 to 1 inch—very dark grayish brown very friable very cobbly sandy loam

*Subsoil:*

1 to 7 inches—brown very friable very cobbly sandy loam

7 to 44 inches—dark yellowish brown very friable very cobbly sandy loam

*Substratum:*

44 to 60 inches—yellowish brown loose very cobbly sandy loam

**Shelocta***Surface layer:*

0 to 1 inch—dark brown very friable loam

*Subsurface layer:*

1 to 3 inches—yellowish brown very friable loam

*Subsoil:*

3 to 11 inches—yellowish brown very friable loam

11 to 40 inches—yellowish brown friable silty clay loam

40 to 50 inches—brownish yellow firm channery silty clay loam

*Substratum:*

50 to 60 inches—soft multicolored shale bedrock

**Soil Properties and Qualities**

*Drainage class:* Jefferson and Shelocta—well drained; Varilla—somewhat excessively drained

*Permeability:* Jefferson and Varilla—moderately rapid; Shelocta—moderate

*Available water capacity:* Jefferson—moderate; Varilla—low; Shelocta—high

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Jefferson—more than 60 inches; Varilla and Shelocta—more than 48 inches

*Shrink-swell potential:* Low

**Use and Management****Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for

cultivated crops are the hazard of erosion, the stones on the surface, and the slope.

### **Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the slope and the stones on the surface.
- The slope and the stones on the surface increase the difficulty of properly managing pastures and limit the use of these soils as pasture and hayland.

### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity in areas of the Jefferson and Shelocta soils, the low available water capacity in areas of the Varilla soil, and the stony surface layer.
- Slope aspect should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is good in areas of the Jefferson and Shelocta soils and fair in areas of the Varilla soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the stones on the surface and the slope.
- In addition, areas of the Varilla soil may provide a poor filter for septic tank absorption fields.
- The stones on the surface and cobbles throughout the soil in areas of the Varilla soil may cause problems for lawns or sites for sanitary facilities or where the soil is landscaped or excavated.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 7s

## **Kt—Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Drainageways, depressions, flood plains, and upland flats

*Size of areas:* 5 to 615 acres

*Major uses:* Pasture, hay, and woodland

### ***Composition***

Ketona soil and similar components: 60 to 80 percent  
Tupelo soil and similar components: 10 to 30 percent  
Contrasting components: 5 to 15 percent

### **Minor Components**

#### *Similar components:*

- Small areas of Bloomingdale and Cranmore soils

#### *Contrasting components:*

- Areas of soils that have hard bedrock at a depth of less than 20 inches
- Small areas of Colbert, Capshaw, Conasauga, and Lyerly soils
- Isolated areas of limestone rock outcrop
- Small areas of Hamblen soils

### **Typical Profile**

#### **Ketona**

##### *Surface layer:*

0 to 6 inches—brown friable silty clay loam

##### *Subsoil:*

6 to 15 inches—grayish brown friable clay that has yellowish brown mottles

15 to 36 inches—grayish brown firm and very firm clay that has gray and yellowish brown mottles

##### *Substratum:*

36 to 48 inches—light olive brown very firm clay that has gray mottles

##### *Bedrock:*

48 inches—hard limestone

#### **Tupelo**

##### *Surface layer:*

0 to 8 inches—yellowish brown friable silt loam that has light olive brown mottles

##### *Subsoil:*

8 to 16 inches—yellowish brown friable silt loam that has light olive brown mottles

16 to 26 inches—light olive brown firm silty clay that has yellowish brown and light brownish gray mottles

26 to 32 inches—pale olive firm clay that has light brownish gray and dark brown mottles

32 to 48 inches—light brownish gray firm clay that has yellowish brown and brown mottles

##### *Substratum:*

48 to 60 inches—gray very firm clay that has strong brown mottles

### **Soil Properties and Qualities**

*Drainage class:* Ketona—poorly drained; Tupelo—somewhat poorly drained

*Permeability:* Slow

*Available water capacity:* Moderate

*Seasonal high water table:* Ketona—between depths

of 6 and 12 inches; Tupelo—between depths of 12 and 24 inches

*Flooding:* Frequent

*Soil reaction:* Ketona—moderately acid to moderately alkaline; Tupelo—strongly acid to moderately alkaline

*Depth to bedrock:* Ketona—more than 40 inches; Tupelo—more than 60 inches

*Shrink-swell potential:* High

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the seasonal high water table and the flooding.
- The wetness delays planting and harvesting in most years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the seasonal high water table and the flooding.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production.
- Forage species that can tolerate the wetness and flooding grow best.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the equipment limitation, plant competition, and seedling mortality.
- Operating equipment when the soils are wet results in excessive rutting or miring.
- Equipment should be operated only when the soils are dry and after gravel or other suitable subgrade material has been added to the main roads.
- If possible, roads should be constructed in areas of nearby, better suited soils.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant

competition that may occur immediately after planting.

- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the seasonal high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Preparing the seedbed so that seedlings can be planted on ridges helps to reduce seedling mortality.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for wetland wildlife habitat is fair.
- The potential for openland and woodland wildlife habitat is fair in areas of the Ketona soil and good in areas of the Tupelo soil.
- Establishing shallow water areas provides a water source for upland wildlife and promotes use of the area by waterfowl, shore birds, and other wetland wildlife.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- Slow permeability and the shrink-swell potential of the subsoil are additional limitations.
- The soil limitations are difficult to overcome.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 4w

## **LhB—Lily loam, 2 to 5 percent slopes**

#### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Ridge crests and shoulder slopes

*Size of areas:* 5 to 270 acres

*Major uses:* Pulpwood production, woodland, pasture, and row crops

#### **Composition**

Lily soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

#### **Minor Components**

*Similar components:*

- Intermingled areas of Lonewood and Hendon soils

*Contrasting components:*

- Areas of Ramsey soils on shoulder slopes
- Isolated areas of sandstone rock outcrops

#### **Typical Profile**

*Surface layer:*

0 to 2 inches—brown friable loam

*Subsoil:*

2 to 31 inches—yellowish brown friable loam

*Substratum:*

31 to 35 inches—brownish yellow firm cobbly sandy loam

*Bedrock:*

35 inches—hard sandstone

#### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

#### **Use and Management**

##### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- The moderate available water capacity and the moderately deep root zone may limit the production of some crop species.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

##### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate a moderately deep root zone and can withstand occasional droughtiness are best suited.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability:* Well suited*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Well suited*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Suited*Management measures and considerations:*

- The main limitation affecting urban uses is the depth to bedrock.

- The moderate depth to bedrock affects most building site developments and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to somewhat overcome the depth to bedrock limitation.

***Interpretive Group****Land capability classification:* 2e**LhC—Lily loam, 5 to 12 percent slopes*****Setting****Physiographic area:* Cumberland Plateau and Mountains*Landscape position:* Ridge crests and side slopes*Size of areas:* 5 to several hundred acres*Major uses:* Woodland, pasture, and row crops***Composition***

Lily soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

***Minor Components****Similar components:*

- Intermingled areas of Lonewood and Hendon soils

*Contrasting components:*

- Areas of Ramsey soils on shoulder slopes
- Isolated areas of sandstone rock outcrop

***Typical Profile****Surface layer:*

0 to 2 inches—brown friable loam

*Subsoil:*

2 to 31 inches—yellowish brown friable loam

*Substratum:*

31 to 35 inches—brownish yellow firm cobbly sandy loam

*Bedrock:*

35 inches—hard sandstone

***Soil Properties and Qualities****Drainage class:* Well drained*Permeability:* Moderately rapid*Available water capacity:* Moderate*Soil reaction:* Very strongly acid or strongly acid*Depth to bedrock:* 20 to 40 inches*Shrink-swell potential:* Low

## ***Use and Management***

### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- In addition, the moderate available water capacity and the moderately deep root zone may limit the production of some crop species.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Forage species that can tolerate a moderately deep root zone and can withstand occasional droughtiness are best suited.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation affecting urban uses is the depth to bedrock.
- The moderate depth to bedrock affects most building site developments and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome the depth to bedrock limitation.

## ***Interpretive Group***

*Land capability classification:* 3e

## **LhD—Lily loam, 12 to 20 percent slopes**

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Ridge crests and side slopes

*Size of areas:* 5 to several hundred acres

*Major uses:* Woodland and pasture

### ***Composition***

Lily soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Lonewood and Hendon soils

*Contrasting components:*

- Areas of Ramsey soils on shoulder slopes
- Isolated areas of sandstone rock outcrop

### **Typical Profile**

*Surface layer:*

0 to 2 inches—brown friable loam

*Subsoil:*

2 to 31 inches—yellowish brown friable loam

*Substratum:*

31 to 35 inches—brownish yellow firm cobbly sandy loam

*Bedrock:*

35 inches—hard sandstone

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- In addition, the moderate available water capacity and the moderately deep root zone may limit the production of some crop species.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderately deep root zone, the moderate available water capacity, and the slope.
- Forage species that can tolerate a moderately deep root zone and can withstand occasional droughtiness are best suited.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred

grazing, and a well planned clipping and harvesting schedule are important management practices.

- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence

rows can break up large, open areas and provide food and cover to wildlife.

- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock and the slope.
- The moderate depth to bedrock and the slope affect most building site developments and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome some of these limitations.

#### **Interpretive Group**

*Land capability classification:* 4e

## **LhE—Lily loam, 20 to 35 percent slopes**

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes and backslopes

*Size of areas:* 5 to 455 acres

*Major uses:* Woodland and wildlife habitat

### **Composition**

Lily soil and similar components: 85 to 95 percent  
Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Small areas of Jefferson and Shelocta soils on the lower parts of slopes
- Intermingled areas of Gilpin soils

*Contrasting components:*

- Areas of Ramsey soils on shoulder slopes
- Isolated areas of sandstone rock outcrop

### **Typical Profile**

*Surface layer:*

0 to 2 inches—brown friable loam

*Subsoil:*

2 to 31 inches—yellowish brown friable loam

*Substratum:*

31 to 35 inches—brownish yellow firm cobbly sandy loam

*Bedrock:*

35 inches—hard sandstone

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Available water capacity:* Moderate

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* 20 to 40 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.

#### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the moderately deep root zone, the moderate available water capacity, and the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by

spreading gravel on the road surface and installing water breaks and culverts.

- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the moderate available water capacity.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The moderate depth to bedrock and the slope affect most building site developments and sanitary facilities.
- A more suitable alternative site should be selected.

#### ***Interpretive Group***

*Land capability classification:* 6e

## **LnB—Lonewood-Hendon complex, 2 to 5 percent slopes**

#### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Broad ridge crests

*Size of areas:* 5 to 170 acres

*Major uses:* Woodland, pine plantations, pasture, and row crops

#### ***Composition***

Lonewood soil and similar components: 60 to 80 percent

Hendon soil and similar components: 10 to 20 percent

Contrasting components: 5 to 15 percent

#### ***Minor Components***

*Similar components:*

- Areas of soils that have less sand in the subsoil than the Lonewood and Hendon soils

*Contrasting components:*

- Intermingled areas of Lily and Gilpin soils
- Scattered areas of Ramsey soils
- Isolated areas of sandstone rock outcrop

#### ***Typical Profile***

##### **Lonewood**

*Surface layer:*

0 to 6 inches—brown very friable fine sandy loam

*Subsoil:*

6 to 24 inches—yellowish brown friable clay loam

24 to 35 inches—strong brown friable clay loam that has light yellowish brown mottles

35 to 54 inches—yellowish red friable clay loam that has light yellowish brown and brownish yellow mottles

*Substratum:*

54 to 60 inches—strong brown friable clay loam and sandy clay loam having yellowish red mottles

**Hendon***Surface layer:*

0 to 1 inch—very dark grayish brown friable silt loam

*Subsurface layer:*

1 to 10 inches—yellowish brown friable silt loam

*Subsoil:*

10 to 25 inches—yellowish brown friable loam

25 to 32 inches—yellowish brown friable firm and brittle loam that has yellowish red mottles and pockets of very pale brown friable silt loam and loam

32 to 44 inches—yellowish red firm and brittle loam that has light olive brown mottles

44 to 65 inches—yellowish red friable loam that has brownish yellow mottles

***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Lonewood—moderate; Hendon—moderate or moderately slow

*Available water capacity:* Lonewood—high; Hendon—moderate

*Seasonal high water table:* Lonewood—at a depth of more than 60 inches; Hendon—between depths of 20 and 36 inches

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Lonewood—40 to 72 inches; Hendon—more than 60 inches

*Shrink-swell potential:* Low

***Use and Management*****Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the moderately deep root zone, the moderate available water capacity, and the wetness in areas of the Hendon soil.
- The moderate available water capacity and the moderately deep root zone may be limitations affecting some crops.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

**Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The growth of some forage species is limited by the moderately deep root zone and the moderate available water capacity in areas of the Hendon soil.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Suited*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability and the clayey subsoil in areas of the Hendon soil.
- In addition, depth to bedrock may be a limitation in areas of the Lonewood soil.
- The moderately slow permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- Special measures are needed to help overcome subsurface drainage problems.
- This map unit is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

**Interpretive Group***Land capability classification:* 2e**LnC—Lonewood-Hendon complex,  
5 to 12 percent slopes****Setting***Physiographic area:* Cumberland Plateau and Mountains*Landscape position:* Ridge crests and shoulder slopes*Size of areas:* 5 to 395 acres*Major uses:* Woodland, pasture, hay, and row crops**Composition**

Lonewood soil and similar components: 60 to 70 percent

Hendon soil and similar components: 10 to 20 percent

Contrasting components: 5 to 25 percent

**Minor Components***Similar components:*

- Areas of soils that have less sand in the subsoil than the Lonewood and Hendon soils

*Contrasting components:*

- Intermingled areas of Lily and Gilpin soils
- Scattered areas of Ramsey soils
- Isolated areas of sandstone rock outcrop

**Typical Profile****Lonewood***Surface layer:*

0 to 6 inches—brown very friable fine sandy loam

*Subsoil:*

6 to 24 inches—yellowish brown friable clay loam

24 to 35 inches—strong brown friable clay loam that has light yellowish brown mottles

35 to 54 inches—yellowish red friable clay loam that has light yellowish brown and brownish yellow mottles

*Substratum:*

54 to 60 inches—strong brown friable clay loam and sandy clay loam having yellowish red mottles

**Hendon***Surface layer:*

0 to 1 inch—very dark grayish brown friable silt loam

*Subsurface layer:*

1 to 10 inches—yellowish brown friable silt loam

*Subsoil:*

10 to 25 inches—yellowish brown friable loam

25 to 32 inches—yellowish brown friable firm and brittle loam that has yellowish red mottles and pockets of very pale brown friable silt loam and loam

32 to 44 inches—yellowish red firm and brittle loam that has light olive brown mottles

44 to 65 inches—yellowish red friable loam that has brownish yellow mottles

**Soil Properties and Qualities***Drainage class:* Well drained*Permeability:* Lonewood—moderate; Hendon—moderate or moderately slow*Available water capacity:* Lonewood—high; Hendon—moderate*Seasonal high water table:* Lonewood—at a depth of more than 60 inches; Hendon—between depths of 20 and 36 inches*Soil reaction:* Very strongly acid or strongly acid*Depth to bedrock:* Lonewood—40 to 72 inches; Hendon—more than 60 inches*Shrink-swell potential:* Low**Use and Management****Cropland***Suitability:* Well suited*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- The moderately deep root zone, the moderate available water capacity, and the wetness are additional concerns.

- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate wetness should be selected for planting.
- The moderate available water capacity and the moderately deep root zone in areas of the Hendon soil may be limitations affecting some crops.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The growth of some forage species is limited by the moderately deep root zone and the moderate available water capacity in areas of the Hendon soil.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- The slope may be a limitation affecting hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability and the clayey subsoil in areas of the Hendon soil and the slope.
- The depth to bedrock may also be a limitation in areas of the Lonewood soil.
- The moderately slow permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- Special measures are needed to help overcome subsurface drainage problems.
- This map unit is best suited to dwellings without basements.
- The slope is a limitation affecting some urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 3e

## **PaC—Pailo gravelly silt loam, 5 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Ridge crests and shoulder slopes

*Size of areas:* 5 to 855 acres

*Major uses:* Cropland, pasture, and hay

### **Composition**

Pailo soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Minvale and Tasso soils
- Intermingled areas of Dewey and Fullerton soils in landscape positions similar to those of the Pailo soil

*Contrasting components:*

- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 1 inch—partially decomposed pine needles and twigs

1 to 6 inches—brown very friable gravelly silt loam

*Subsurface layer:*

6 to 15 inches—yellowish brown very friable gravelly silt loam

*Subsoil:*

15 to 25 inches—yellowish brown friable very gravelly silty clay loam

25 to 36 inches—strong brown friable very gravelly clay loam that has brownish yellow mottles

36 to 50 inches—strong brown friable gravelly clay

50 to 62 inches—mottled red, strong brown, and brownish yellow firm gravelly clay

### **Soil Properties and Qualities**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid in the upper part of the profile and slow in the lower part

*Available water capacity:* Low

*Flooding:* None

*Soil reaction:* Extremely acid to strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion and the low available water capacity.
- The gravelly surface layer may restrict tillage.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control

erosion, increase the rate of water infiltration, and maintain soil tilth.

- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the low available water capacity.
- The slope may be a limitation affecting hayland.
- Plant species that can withstand droughtiness grow best.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- The seedling mortality rate may be high because of the gravelly surface layer and the low available water capacity.
- Reinforcement plantings can be made until a desirable stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.

- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the pebbles and cobbles throughout the soil and the slope.
- The gravel in the surface layer and the pebbles, cobbles, and stones throughout the soil may cause problems in areas used for lawns or if the soil is landscaped or excavated.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 4s

## **PaD—Pailo gravelly silt loam, 12 to 25 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Shoulder slopes, side slopes, and narrow ridge crests

*Size of areas:* 5 to 575 acres

*Major uses:* Pasture, hay, and woodland

### **Composition**

Pailo soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Intermingled areas of Minvale and Tasso soils
- Intermingled areas of Dewey and Fullerton soils in landscape positions similar to those of the Pailo soil

*Contrasting components:*

- Isolated areas of Talbott soils and rock outcrops

### **Typical Profile**

*Surface layer:*

0 to 1 inch—partially decomposed pine needles and twigs

1 to 6 inches—brown very friable gravelly silt loam

*Subsurface layer:*

6 to 15 inches—yellowish brown very friable gravelly silt loam

*Subsoil:*

15 to 25 inches—yellowish brown friable very gravelly silty clay loam

25 to 36 inches—strong brown friable very gravelly clay loam that has brownish yellow mottles

36 to 50 inches—strong brown friable gravelly clay

50 to 62 inches—mottled red, strong brown, and brownish yellow firm gravelly clay

### **Soil Properties and Qualities**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid in the upper part of the profile and slow in the lower part

*Available water capacity:* Low

*Soil reaction:* Extremely acid to strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the slope, and the low available water capacity.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the low available water capacity and the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Plant species that can withstand droughtiness grow best.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the low available water capacity and the gravelly surface layer.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Suited*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.

- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Poorly suited*Management measures and considerations:*

- The main limitations affecting urban uses are the pebbles, cobbles, and stones throughout the soil and the slope.
- The gravel in the surface layer and the pebbles, cobbles, and stones throughout the soil may cause problems in areas used for lawns or if the soil is landscaped or excavated.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

**Interpretive Group***Land capability classification:* 6s**PaF—Pailo gravelly silt loam, 25 to 60 percent slopes****Setting***Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Side slopes*Size of areas:* 5 to several hundred acres*Major uses:* Woodland**Composition**

Pailo soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

**Minor Components***Similar components:*

- Intermingled areas of Minvale and Tasso soils
- Intermingled areas of Dewey and Fullerton soils in landscape positions similar to those of the Pailo soil

*Contrasting components:*

- Isolated areas of Talbott soils and rock outcrops

**Typical Profile***Surface layer:*

0 to 1 inch—partially decomposed pine needles and twigs

1 to 6 inches—brown very friable gravelly silt loam

*Subsurface layer:*

6 to 15 inches—yellowish brown very friable gravelly silt loam

*Subsoil:*

15 to 25 inches—yellowish brown friable very gravelly silty clay loam

25 to 36 inches—strong brown friable very gravelly clay loam that has brownish yellow mottles

36 to 50 inches—strong brown friable gravelly clay

50 to 62 inches—mottled red, strong brown, and brownish yellow firm gravelly clay

**Soil Properties and Qualities**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid in the upper part of the profile and slow in the lower part

*Available water capacity:* Low

*Soil reaction:* Extremely acid to strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

**Use and Management****Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concern in areas used for cultivated crops is the hazard of erosion.
- The slope limits the use of most equipment.

**Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the low available water capacity and the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.

**Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, plant competition, and seedling mortality.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.

- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the low available water capacity and the gravelly surface layer.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the pebbles, cobbles, and stones throughout the soil and the slope.
- The gravel in the surface layer and the pebbles, cobbles, and stones throughout the soil may cause problems in areas used for lawns or if the soil is landscaped or excavated.
- The slope is a limitation affecting most urban uses.
- A suitable alternative site should be selected.

**Interpretive Group**

*Land capability classification:* 7s

## PCF—Pits, clay, 10 to 80 percent slopes

### **Setting**

*Physiographic area:* Cumberland Plateau and Escarpment

*Landscape position:* Ridgetops and side slopes

*Size of areas:* 5 to 50 acres

*Major uses:* Idle land

### **Composition**

Pits, clay, and similar components: 75 to 90 percent

Contrasting components: 10 to 25 percent

### **Minor Components**

*Similar components:*

- Bare areas of shale bedrock
- Areas of severely eroded soils or gullied land

*Contrasting components:*

- Scattered areas of Gilpin, Petros, and Sequoia soils

### **Typical Profile**

A typical profile is not given for this map unit.

### **Soil Properties and Qualities**

In areas of this map unit, soil materials are disturbed and are extremely variable. Areas consist of excavations that have been made to obtain shale and clay. The remaining high walls and spoil piles are included in the map unit.

### **Use and Management**

- The main limitations are the hazard of erosion and the slope.
- Providing a good seedbed and proper fertility and mulching seeded areas help to establish vegetation.
- Problem areas may require intensive measures, such as hydroseeding and sodding, for the establishment of vegetation.
- In areas where vegetation cannot be established, erosion may be controlled by using coarse gravel, gabion stone, or riprap to protect the exposed surface.

### **Interpretive Group**

*Land capability classification:* None assigned

## PM—Pits, mine, and dumps

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Uplands

*Size of areas:* About 40 acres

*Slope range:* 10 to 80 percent

*Major uses:* Mining of limestone

### **Composition**

Pits, mine, and dumps, and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Highwalls, spoil piles, and piles of processed limestone and areas with buildings and limestone-processing machinery

*Contrasting components:*

- Small areas of Colbert, Lyerly, and Barfield soils

### **Typical Profile**

A typical profile is not given for this map unit.

### **Soil Properties and Qualities**

The soil materials and miscellaneous areas in this map unit vary greatly.

### **Use and Management**

- Extensive reclamation, landshaping, and intensive erosion-control measures are needed for most uses.
- Onsite investigation is needed to determine the limitations affecting any proposed use.

### **Interpretive Group**

*Land capability classification:* None assigned

## Pp—Pope and Philo loams, frequently flooded

### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Flood plains and alluvial fans

*Size of areas:* 5 to 70 acres

*Slope range:* 0 to 3 percent

*Major uses:* Woodland and some cropland

### **Composition**

Pope soil and similar components: 0 to 90 percent

Philo soil and similar components: 0 to 80 percent

Contrasting components: 10 to 20 percent

### **Minor Components**

*Similar components:*

- Areas of Pope and Philo soils that flood occasionally or rarely
- Areas of Allegheny and Cotaco soils in the slightly higher elevations

*Contrasting components:*

- Areas of soils that do not flood
- Isolated areas of Atkins soils in depressions

### **Typical Profile**

#### **Pope**

*Surface layer:*

0 to 5 inches—dark brown very friable loam

*Subsurface layer:*

5 to 8 inches—dark yellowish brown very friable loam

*Subsoil:*

8 to 43 inches—dark yellowish brown very friable loam

*Substratum:*

43 to 60 inches—yellowish brown very friable very gravelly sandy loam

#### **Philo**

*Surface layer:*

0 to 6 inches—brown very friable loam

*Subsoil:*

6 to 27 inches—dark yellowish brown friable loam

27 to 36 inches—dark yellowish brown friable loam that has brown and gray mottles

*Substratum:*

36 to 48 inches—yellowish brown very friable sandy loam that has gray and brown mottles

48 to 60 inches—gray very friable gravelly sandy loam that has reddish mottles

### **Soil Properties and Qualities**

*Drainage class:* Pope—well drained; Philo—moderately well drained

*Permeability:* Moderately rapid

*Available water capacity:* Pope—high; Philo—moderate

*Seasonal high water table:* Pope—between depths of 60 and 72 inches; Philo—between depths of 24 and 36 inches

*Flooding:* Occasional

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main concern in areas used for cultivated crops is the flooding.
- Some crops may be damaged by flooding in winter and early spring.
- In addition, the wetness in areas of the Philo soil delays planting and harvesting in some years.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.

- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation affecting urban uses is the flooding.
- In addition, wetness in areas of the Philo soil is a limitation affecting most urban uses.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 2w

### **RaC—Ramsey loam, 5 to 12 percent slopes, very rocky**

#### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Convex ridge crests, benches, and shoulder slopes

*Size of areas:* 5 to 200 acres

*Major uses:* Woodland

#### **Composition**

Ramsey soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

#### **Minor Components**

*Similar components:*

- Intermingled areas of Lily and Gilpin soils

*Contrasting components:*

- Areas of Hendon and Lonewood soils
- Isolated areas of sandstone rock outcrop

#### **Typical Profile**

*Surface layer:*

0 to 2 inches—dark yellowish brown very friable loam

*Subsoil:*

2 to 15 inches—dark yellowish brown loam

15 to 18 inches—yellowish brown very friable sandy loam

*Bedrock:*

18 inches—hard sandstone bedrock

#### **Soil Properties and Qualities**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Available water capacity:* Very low

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Less than 20 inches

*Shrink-swell potential:* Low

#### **Use and Management**

##### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting cultivated crops are the erosion hazard, the depth to bedrock, and the very low available water capacity.

##### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitation is the very low available water capacity.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

##### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the seedling mortality rate and the hazard of windthrow.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth and the very low available water capacity.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.

- Windthrow is a hazard in some areas because of the shallow root zone.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is poor.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitation affecting urban uses is the depth to bedrock.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 6s

### **RrD—Ramsey-Rock outcrop complex, 12 to 20 percent slopes**

#### **Setting**

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes

*Size of areas:* 5 to 345 acres

*Major uses:* Woodland

#### **Composition**

Ramsey soil and similar components: 60 to 80 percent

Rock outcrop: 10 to 35 percent

Contrasting components: 5 to 30 percent

#### **Minor Components**

*Similar components:*

- Intermingled areas of Lily and Gilpin soils
- Areas of soils that have more rock fragments throughout than the Ramsey soil

*Contrasting components:*

- Areas of Hendon and Lonewood soils

#### **Typical Profile**

##### **Ramsey**

*Surface layer:*

0 to 2 inches—dark yellowish brown very friable loam

*Subsoil:*

2 to 15 inches—dark yellowish brown loam

15 to 18 inches—yellowish brown very friable sandy loam

*Bedrock:*

18 inches—hard sandstone bedrock

##### **Rock outcrop**

Rock outcrop consists of areas of exposed sandstone that are 2 to 20 feet across and as much as 30 feet high. Most outcrops protrude from the surface a few inches. Some outcrops form nearly vertical cliffs. Rock outcrop supports little or no vegetation.

#### **Properties and Qualities of the Ramsey Soil**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Available water capacity:* Very low

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Less than 20 inches

*Shrink-swell potential:* Low

#### **Use and Management**

##### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the shallow root zone, the depth to bedrock, the very low available water capacity, and the Rock outcrop.
- A suitable alternative site should be selected.

##### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the slope, the very low available water capacity, and the Rock outcrop.

- The slope and Rock outcrop increase the difficulty of properly managing pastures and limit the use of this map unit for pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and the hazard of windthrow.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth and the very low available water capacity.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is poor.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock, the slope, and the Rock outcrop.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 6s

## **RrF—Ramsey-Rock outcrop complex, 20 to 50 percent slopes**

### ***Setting***

*Physiographic area:* Cumberland Plateau and Mountains

*Landscape position:* Side slopes

*Size of areas:* 5 to several hundred acres

*Major uses:* Woodland

### ***Composition***

Ramsey soil and similar components: 60 to 80 percent

Rock outcrop: 10 to 35 percent

Contrasting components: 5 to 30 percent

### ***Minor Components***

*Similar components:*

- Intermingled shallow soils and areas that have more rock fragments in the subsoil than the Ramsey soil
- Scattered areas of Lily soils
- Areas of soils that have more clay in the subsoil than the Ramsey soil

*Contrasting components:*

- Areas of Jefferson and Varilla soils on footslopes and along drainageways

**Typical Profile****Ramsey***Surface layer:*

0 to 2 inches—dark yellowish brown very friable loam

*Subsoil:*

2 to 15 inches—dark yellowish brown loam

15 to 18 inches—yellowish brown very friable sandy loam

*Bedrock:*

18 inches—hard sandstone bedrock

**Rock outcrop**

Rock outcrop consists of areas of exposed sandstone that are 2 to 20 feet across and as much as 40 feet high. Most outcrops protrude from the surface a few inches. Some outcrops form nearly vertical bluffs. Rock outcrop supports little or no vegetation.

**Properties and Qualities of the Ramsey Soil**

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Available water capacity:* Very low

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* Less than 20 inches

*Shrink-swell potential:* Low

**Use and Management****Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the shallow root zone, the depth to bedrock, the very low available water capacity, and the Rock outcrop.
- A suitable alternative site should be selected.

**Pasture and hay**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations are the slope, the very low available water capacity, and the Rock outcrop.

**Woodland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and the hazard of windthrow.

- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth and the very low available water capacity.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is very poor.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.

- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock and the Rock outcrop.
- A suitable alternative site should be selected.

### **Interpretive Group**

*Land capability classification:* 7s

## **SaC—Salacoa loam, 5 to 12 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Dissected ridges and side slopes

*Size of areas:* 5 to 295 acres

*Major uses:* Pasture, hayland, and woodland

### **Composition**

Salacoa soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

### **Minor Components**

*Similar components:*

- Intermingled areas that have more rock fragments in the subsoil than the Salacoa soil

*Contrasting components:*

- Small areas of Apison, Sunlight, and Townley soils
- Isolated areas of shale and sandstone rock outcrop

### **Typical Profile**

*Surface layer:*

0 to 5 inches—dark yellowish brown very friable loam

*Subsoil:*

5 to 20 inches—yellowish brown very friable gravelly silt loam

20 to 35 inches—strong brown friable gravelly silt loam

35 to 62 inches—strong brown friable very gravelly silt loam

*Bedrock:*

62 inches—soft shale interbedded with reddish sandstone and siltstone

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid to moderately acid, except in limed areas

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Well suited*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Suited*Management measures and considerations:*

- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome this limitation.

**Interpretive Group***Land capability classification:* 3e**SgE—Sequoia-Gilpin complex, 20 to 35 percent slopes****Setting***Physiographic area:* Cumberland Plateau and Mountains*Landscape position:* Side slopes and backslopes*Size of areas:* 10 to 660 acres*Major uses:* Woodland**Composition**

Sequoia soil and similar components: 40 to 55 percent

Gilpin soil and similar components: 30 to 45 percent

Contrasting components: 5 to 15 percent

**Minor Components***Similar components:*

- Scattered areas of soils that have shale bedrock at a depth of more than 40 inches

*Contrasting components:*

- Intermingled areas of Bouldin soils
- Shelocta and Jefferson soils on the lower side slopes

**Typical Profile****Sequoia***Surface layer:*

0 to 1 inch—yellowish brown very friable silt loam

*Subsoil:*

1 to 12 inches—yellowish brown friable silty clay loam

12 to 27 inches—yellowish red firm channery silty clay

*Bedrock:*

27 to 31 inches—rippable multicolored shale bedrock

**Gilpin***Surface layer:*

0 to 1 inch—brown very friable loam

*Subsoil:*

1 to 5 inches—yellowish brown friable loam

5 to 34 inches—yellowish brown friable channery silty clay loam

*Substratum:*

34 to 38 inches—yellowish brown firm channery silty clay

*Bedrock:*

38 to 50 inches—soft multicolored mudstone

**Soil Properties and Qualities***Drainage class:* Well drained*Permeability:* Sequoia—moderately slow; Gilpin—moderate*Available water capacity:* Moderate*Soil reaction:* Very strongly acid or strongly acid*Depth to bedrock:* 20 to 40 inches*Shrink-swell potential:* Sequoia—moderate; Gilpin—low**Use and Management****Cropland***Suitability:* Unsited*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the moderate depth to bedrock, and the slope.

**Pasture and hay***Suitability:* Poorly suited*Management measures and considerations:*

- The main limitations are the slope and the moderate available water capacity.
- The slope increases the difficulty of properly

managing pastures and limits the use of this map unit as pasture and hayland.

- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, and the plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- In areas of the Sequoia soil, the potential for openland wildlife habitat is fair and the potential for woodland wildlife habitat is good.
- In areas of Gilpin soil, the potential for openland wildlife habitat is poor and the potential for woodland wildlife habitat is fair.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.

- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the depth to bedrock and the slope.
- In addition, the clayey subsoil and moderate shrink-swell potential of the Sequoia soil may be limitations affecting most sanitary facilities and building site developments.
- A more suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 6e

## **ShB—Shady loam, 1 to 5 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Low terraces

*Size of areas:* 5 to 215 acres

*Major uses:* Cropland, pasture, and hay

### ***Composition***

Shady soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Etowah and Holston soils

*Contrasting components:*

- Scattered areas of Cobstone soils
- Intermingled areas of Altavista soils
- Areas of Shady and Hamblen soils that are occasionally flooded

### Typical Profile

#### Surface layer:

0 to 8 inches—dark yellowish brown very friable loam

#### Subsoil:

8 to 25 inches—strong brown friable clay loam

25 to 32 inches—strong brown friable sandy clay loam

32 to 42 inches—yellowish brown friable loam

42 to 72 inches—yellowish brown very friable very cobbly sandy loam

### Soil Properties and Qualities

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* Between depths of 60 and 72 inches

*Flooding:* None

*Soil reaction:* Very strongly acid to moderately acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### Use and Management

#### Cropland

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### Pasture and hay

*Suitability:* Well suited (fig. 10)

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### Woodland

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant

competition that may occur immediately after planting.

- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### Wildlife habitat

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### Urban development

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting urban uses.

### Interpretive Group

*Land capability classification:* 2e

## Sm—Shady loam, 0 to 3 percent slopes, occasionally flooded

### Setting

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains and low terraces

*Size of areas:* 5 to 425 acres

*Major uses:* Cropland, pasture, and hay

### Composition

Shady soil and similar components: 75 to 85 percent

Contrasting components: 15 to 25 percent



Figure 10.—Hay in an area of Shady loam, 1 to 5 percent slopes. This map unit has few limitations affecting hay and pasture. Allen loam, 5 to 12 percent slopes, is on the steeper footslopes near the woodland. Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony, is in the steeper wooded areas.

### **Minor Components**

#### *Similar components:*

- Scattered areas of Etowah and Holston soils
- Isolated areas of Wolftever soils
- Areas of Hamblen soils along drainageways

#### *Contrasting components:*

- Areas of soils that do not flood
- Intermingled areas of Capshaw and Cobstone soils in landscape positions similar to those of the Shady soil
- Small areas of Bloomingdale and Cranmore soils in depressions and at the lower elevations

### **Typical Profile**

#### *Surface layer:*

0 to 8 inches—dark yellowish brown very friable loam

#### *Subsoil:*

8 to 25 inches—strong brown friable clay loam

25 to 32 inches—strong brown friable sandy clay loam

32 to 42 inches—yellowish brown friable loam

42 to 72 inches—yellowish brown very friable very cobbly sandy loam

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Seasonal high water table:* Between depths of 60 and 72 inches

*Flooding:* Occasional

*Soil reaction:* Very strongly acid to moderately acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

## ***Use and Management***

### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Some crops may be damaged by flooding or ponding in winter and early spring.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.

- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and ponding.
- The flooding and ponding are difficult to overcome.
- A suitable alternative site should be selected.

## ***Interpretive Group***

*Land capability classification:* 2w

## **St—Staser loam, 0 to 3 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains, low terraces, and natural levees of the Tennessee River

*Size of areas:* 5 to 330 acres

*Major uses:* Cropland, pasture, and hay

### ***Composition***

Staser soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of Etowah, Holston, and Shady soils

*Contrasting components:*

- Small areas of soils that have steeper slopes than the Shady soils; near tributary streams and on streambanks
- Areas of Hamblen soils along drainageways
- Intermingled areas of Egam soils

### ***Typical Profile***

*Surface layer:*

0 to 10 inches—very dark grayish brown very friable loam

*Subsoil:*

10 to 30 inches—dark brown very friable loam

30 to 60 inches—dark yellowish brown very friable loam

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate or moderately rapid

*Available water capacity:* High

*Seasonal high water table:* Between depths of 48 and 72 inches or deeper

*Flooding:* None; most areas are protected from flooding by Watts Bar Dam

*Soil reaction:* Slightly acid to slightly alkaline

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting urban uses.
- Wetness is a limitation affecting some building sites and sanitary facilities.
- This soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome the wetness limitation.

### **Interpretive Group**

*Land capability classification:* 1

## **TaD—Talbot-Rock outcrop complex, 5 to 25 percent slopes**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Low ridges and upland flats

*Size of areas:* 5 to 80 acres

*Major uses:* Pasture, hay, and woodland

### **Composition**

Talbot soil and similar components: 50 to 80 percent

Rock outcrop: 15 to 40 percent

Contrasting components: 5 to 20 percent

### **Minor Components**

#### *Similar components:*

- Scattered areas of Barfield and Lyerly soils
- Intermingled areas of Conasauga soils

#### *Contrasting components:*

- Areas of Collegedale, Capshaw, and Dewey soils

### **Typical Profile**

#### **Talbott**

##### *Surface layer:*

0 to 6 inches—yellowish brown friable silt loam

##### *Subsoil:*

6 to 24 inches—yellowish red firm clay that has brown mottles

24 to 36 inches—yellowish brown very firm clay that has red mottles

##### *Bedrock:*

36 inches—hard limestone

#### **Rock outcrop**

Rock outcrop consists of exposed areas of limestone or dolomite and areas that have less than 2 or 3 inches of soil over bedrock. Most outcrops protrude from the surface a few inches to almost 2 feet. Rock outcrop supports little or no vegetation.

### **Properties and Qualities of the Talbott Soil**

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Available water capacity:* Moderate

*Soil reaction:* Strongly acid to slightly acid

*Depth to bedrock:* 20 to 40 inches to hard bedrock

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion, the Rock outcrop, and the slope.

#### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations are the Rock outcrop and the slope.
- The Rock outcrop and the slope increase the difficulty of properly managing pastures and limit the use of this map unit as hayland.
- Proper stocking rates, pasture rotation, deferred

grazing, and a well planned clipping and harvesting schedule are important management practices.

- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, plant competition, and Rock outcrop.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope and Rock outcrop generally are limitations only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough and that conventional equipment can be used.
- The Rock outcrop is usually widely spaced and scattered enough that it can be avoided by the roads and trails used for equipment.
- The depth to bedrock should be carefully considered when planting sites are selected for seedlings.
- Slope aspect and the content of gravel in the surface layer should also be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cutting or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Trees and shrubs along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the Rock outcrop, the depth to bedrock, the moderately slow permeability, the shrink-swell potential, and the slope.
- A suitable alternative site should be selected.

#### **Interpretive Group**

*Land capability classification:* 6s

### **TmB—Tasso-Minvale complex, 2 to 5 percent slopes**

#### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Footslopes, benches, and fans

*Size of areas:* 5 to 140 acres

*Major uses:* Cropland, pasture, and hay

#### **Composition**

Tasso soil and similar components: 50 to 60 percent

Minvale soil and similar components: 30 to 40 percent

Contrasting components: 5 to 20 percent

#### **Minor Components**

*Similar components:*

- Scattered areas of Fullerton, Waynesboro, Etowah, and Dewey soils

*Contrasting components:*

- Intermingled areas of Pailo soils
- Areas of Wax and Rockdell soils on flood plains and stream terraces

#### **Typical Profile**

##### **Tasso**

*Surface layer:*

0 to 7 inches—brown friable gravelly loam

*Subsoil:*

7 to 20 inches—yellowish brown friable gravelly clay loam

20 to 26 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

26 to 34 inches—strong brown firm and brittle gravelly clay loam that has pinkish gray mottles

34 to 44 inches—strong brown friable gravelly loam that has light brown mottles

44 to 54 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

54 to 72 inches—yellowish brown friable gravelly clay loam that has strong brown and pinkish gray mottles

##### **Minvale**

*Surface layer:*

0 to 8 inches—brown friable gravelly silt loam

*Subsurface layer:*

8 to 13 inches—strong brown friable gravelly silt loam

*Subsoil:*

13 to 30 inches—yellowish red friable gravelly silty clay loam

30 to 60 inches—yellowish red friable gravelly silty clay loam that has pale brown mottles

60 to 72 inches—yellowish red friable gravelly silty clay loam that has brownish yellow, light yellowish brown, and strong brown mottles

#### **Soil Properties and Qualities**

*Drainage class:* Tasso—moderately well drained; Minvale—well drained

*Permeability:* Tasso—moderately slow; Minvale—moderate

*Available water capacity:* Tasso—moderate; Minvale—high

*Seasonal high water table:* Between depths of 20 and 40 inches

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Tasso—moderate; Minvale—low

#### **Use and Management**

##### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the moderately deep root zone,

the moderate available water capacity, and the wetness in areas of the Tasso soil.

- The moderate available water capacity and the moderately deep root zone may be limitations affecting some crops.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The growth of some forage species is limited by the moderately deep root zone and the moderate available water capacity in areas of the Tasso soil.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability, the clayey subsoil, the low soil strength, and the shrink-swell potential in areas of the Tasso soil.
- The moderately slow permeability of the Tasso soil and the clayey subsoil of both soils are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soils are used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- Special measures are needed to help overcome subsurface drainage problems.
- The Tasso soil is best suited to dwellings without basements.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 2e

## **TmC—Tasso-Minvale complex, 5 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Footslopes, benches, and fans

*Size of areas:* 5 to 390 acres

*Major uses:* Cropland, pasture, and hay

### **Composition**

Tasso soil and similar components: 40 to 60 percent

Minvale soil and similar components: 30 to 40 percent

Contrasting components: 5 to 20 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Fullerton, Waynesboro, Etowah, and Dewey soils

*Contrasting components:*

- Intermingled areas of Pailo soils
- Areas of Wax and Rockdell soils on flood plains and stream terraces

### **Typical Profile**

#### **Tasso**

*Surface layer:*

0 to 7 inches—brown friable gravelly loam

*Subsoil:*

7 to 20 inches—yellowish brown friable gravelly clay loam

20 to 26 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

26 to 34 inches—strong brown firm and brittle gravelly clay loam that has pinkish gray mottles

34 to 44 inches—strong brown friable gravelly loam that has light brown mottles

44 to 54 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

54 to 72 inches—yellowish brown friable gravelly clay loam that has strong brown and pinkish gray mottles

#### **Minvale**

*Surface layer:*

0 to 8 inches—brown friable gravelly silt loam

*Subsurface layer:*

8 to 13 inches—strong brown friable gravelly silt loam

*Subsoil:*

13 to 30 inches—yellowish red friable gravelly silty clay loam

30 to 60 inches—yellowish red friable gravelly silty clay loam that has pale brown mottles

60 to 72 inches—yellowish red friable gravelly silty clay loam that has brownish yellow, light yellowish brown, and strong brown mottles

### **Soil Properties and Qualities**

*Drainage class:* Tasso—moderately well drained;  
Minvale—well drained

*Permeability:* Tasso—moderately slow; Minvale—moderate

*Available water capacity:* Tasso—moderate; Minvale—high

*Seasonal high water table:* Between depths of 20 and 40 inches

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Tasso—moderate; Minvale—low

### **Use and Management**

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Additional concerns are the moderately deep root zone, the moderate available water capacity, and the wetness in areas of the Tasso soil.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- The moderate available water capacity and the moderately deep root zone may be limitations affecting some crops.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The growth of some forage species is limited by the moderately deep root zone and the moderate available water capacity in areas of the Tasso soil.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- The slope may be a limitation affecting hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.

- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the moderately slow permeability, the clayey subsoil, the low soil strength, and the shrink-swell potential in areas of the Tasso soil.
- The slope is an additional limitation affecting urban development.
- The moderately slow permeability of the Tasso soil and the clayey subsoil of both soils are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for

local roads and streets or if the soils are used as a source of roadfill.

- The shrink-swell potential in the subsoil may be a problem when footers and basements are constructed.
- The slope is a limitation affecting some urban uses.
- The Tasso soil is best suited to dwellings without basements.
- Special measures are needed to help overcome subsurface drainage problems.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 3e

## **TmD—Tasso-Minvale complex, 12 to 25 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Foothills, benches, and fans

*Size of areas:* 5 to 40 acres

*Major uses:* Pasture and hay

### ***Composition***

Tasso soil and similar components: 40 to 60 percent

Minvale soil and similar components: 30 to 40 percent

Contrasting components: 5 to 20 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of Fullerton, Waynesboro, Etowah, and Dewey soils

*Contrasting components:*

- Intermingled areas of Pailo soils
- Small areas of Wax and Rockdell soils on flood plains and stream terraces

### ***Typical Profile***

#### **Tasso**

*Surface layer:*

0 to 7 inches—brown friable gravelly loam

*Subsoil:*

7 to 20 inches—yellowish brown friable gravelly clay loam

20 to 26 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

26 to 34 inches—strong brown firm and brittle gravelly clay loam that has pinkish gray mottles

34 to 44 inches—strong brown friable gravelly loam that has light brown mottles

44 to 54 inches—strong brown friable gravelly clay loam that has pinkish gray mottles

54 to 72 inches—yellowish brown friable gravelly clay loam that has strong brown and pinkish gray mottles

### **Minvale**

*Surface layer:*

0 to 8 inches—brown friable gravelly silt loam

*Subsurface layer:*

8 to 13 inches—strong brown friable gravelly silt loam

*Subsoil:*

13 to 30 inches—yellowish red friable gravelly silty clay loam

30 to 60 inches—yellowish red friable gravelly silty clay loam that has pale brown mottles

60 to 72 inches—yellowish red friable gravelly silty clay loam that has brownish yellow, light yellowish brown, and strong brown mottles

### **Soil Properties and Qualities**

*Drainage class:* Tasso—moderately well drained; Minvale—well drained

*Permeability:* Tasso—moderately slow; Minvale—moderate

*Available water capacity:* Tasso—moderate; Minvale—high

*Seasonal high water table:* Between depths of 20 and 40 inches

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Tasso—moderate; Minvale—low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.
- Additional concerns are the moderately deep root zone, the moderate available water capacity, and the wetness in areas of the Tasso soil.
- The wetness delays planting and harvesting in some years.
- Crop species that have a short growing season and can tolerate the wetness should be selected for planting.
- The moderate available water capacity and the

moderately deep root zone may be limitations affecting some crops.

- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of these soils as hayland.
- The growth of some forage species is limited by the moderately deep root zone and the moderate available water capacity in areas of the Tasso soil.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- When establishing a new forest crop, the seedling mortality rate may be high because of the gravelly surface layer.
- Slope aspect and the content of gravel in the

surface layer should be carefully considered when selecting planting sites for seedlings.

- Reinforcement plantings can be made until the desired stand is attained.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cutting or by applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair, and the potential for woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Trees and shrubs along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitation affecting urban uses is the slope.
- Additional limitations are the moderately slow permeability, the clayey subsoil, the low soil strength, and the shrink-swell potential in areas of the Tasso soil.
- The moderately slow permeability of the Tasso soil and the clayey subsoil of both soils are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soils are used as a source of roadfill.
- The shrink-swell potential in the subsoil may be a

problem when footers and basements are constructed.

- The Tasso soil is best suited to dwellings without basements.
- Special measures are needed to help overcome subsurface drainage problems.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

#### ***Interpretive Group***

*Land capability classification:* 4e

### **TsC—Townley-Sunlight complex, 5 to 12 percent slopes**

#### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Convex ridgetops and side slopes

*Size of areas:* 5 to 725 acres

*Major uses:* Woodland and wildlife habitat

#### ***Composition***

Townley soil and similar components: 50 to 70 percent  
Sunlight soil and similar components: 20 to 40 percent

Contrasting components: 5 to 20 percent

#### ***Minor Components***

*Similar components:*

- Intermingled areas of Apison soils
- Areas of soils that have clayey subsoil layers less than 10 inches thick
- Isolated areas that have hard bedrock between depths of 10 and 40 inches

*Contrasting components:*

- Scattered areas of soils that have soft bedrock between depths of 40 and 60 inches
- Isolated areas of sandstone or shale rock outcrop

#### ***Typical Profile***

##### **Townley**

*Surface layer:*

0 to 3 inches—brown friable silt loam

*Subsoil:*

3 to 28 inches—strong brown firm clay that has yellowish mottles in the lower part

*Soft bedrock:*

28 to 60 inches—yellowish brown tilted sandy shale and siltstone

**Sunlight***Surface layer:*

0 to 8 inches—dark yellowish brown very friable gravelly loam

*Subsoil:*

8 to 17 inches—strong brown friable very gravelly clay loam that has yellowish red mottles

*Soft bedrock:*

17 to 48 inches—red tilted sandstone and sandy shale that can be dug with a spade

**Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Townley—slow; Sunlight—moderate

*Available water capacity:* Townley—low; Sunlight—very low

*Soil reaction:* Townley—very strongly acid to moderately acid; Sunlight—very strongly acid or strongly acid

*Depth to bedrock:* Townley—20 to 40 inches to soft bedrock; Sunlight—10 to 20 inches to soft bedrock

*Shrink-swell potential:* Townley—moderate; Sunlight—low

**Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the hazard of erosion on both soils, the depth to bedrock and the very low available water capacity of the Sunlight soil, and the low available water capacity of the Townley soil.

**Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the low available water capacity of the Townley soil and the very low available water capacity of the Sunlight soil.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main management concerns are plant competition in areas of the Townley soil and seedling mortality and the hazard of windthrow in areas of the Sunlight soil.

- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the shallow rooting depth and the very low available water capacity of the Sunlight soil.
- Slope aspect and the depth to bedrock should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- Windthrow is a hazard in some areas because of the shallow root zone in the Sunlight soil.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is good in areas of the Townley soil.
- The potential for woodland wildlife habitat is good in areas of the Townley soil and fair in areas of the Sunlight soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the

restricted permeability, the clayey subsoil, the low soil strength, the shrink-swell potential, the depth to bedrock, and the slope.

- The slow permeability in the subsoil, the clayey subsoil, and the shrink-swell potential of the Townley soil are limitations affecting some sanitary facilities and building site developments.
- The moderate permeability of the Sunlight soil may be a limitation affecting some sanitary facilities.
- The low soil strength may be a problem on sites for local roads and streets or if the soils are used as a source of roadfill.
- The limited depth to bedrock and the slope are limitations affecting most building site developments.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 6e

## **TsD—Townley-Sunlight complex, 12 to 25 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Dissected convex ridgetops and side slopes

*Size of areas:* 5 to 345 acres

*Major uses:* Woodland and wildlife habitat

### ***Composition***

Townley soil and similar components: 50 to 70 percent  
Sunlight soil and similar components: 20 to 40 percent

Contrasting components: 5 to 20 percent

### ***Minor Components***

*Similar components:*

- Intermingled areas of Apison soils
- Areas of soils that have clayey subsoil layers less than 10 inches thick
- Isolated areas that have hard bedrock between depths of 10 and 40 inches

*Contrasting components:*

- Scattered areas of soils that have soft bedrock between depths of 40 and 60 inches
- Isolated areas of sandstone or shale rock outcrop

### ***Typical Profile***

#### **Townley**

*Surface layer:*

0 to 3 inches—brown friable silt loam

*Subsoil:*

3 to 28 inches—strong brown firm clay that has yellowish mottles in the lower part

*Soft bedrock:*

28 to 60 inches—yellowish brown tilted sandy shale and siltstone

#### **Sunlight**

*Surface layer:*

0 to 8 inches—dark yellowish brown very friable gravelly loam

*Subsoil:*

8 to 17 inches—strong brown friable very gravelly clay loam that has yellowish red mottles

*Soft bedrock:*

17 to 48 inches—red tilted sandstone and sandy shale that can be dug with a spade

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Townley—slow; Sunlight—moderate

*Available water capacity:* Townley—low; Sunlight—very low

*Soil reaction:* Townley—very strongly acid to moderately acid; Sunlight—very strongly acid or strongly acid

*Depth to bedrock:* Townley—20 to 40 inches to soft bedrock; Sunlight—10 to 20 inches to soft bedrock

*Shrink-swell potential:* Townley—moderate; Sunlight—low

### ***Use and Management***

#### **Cropland**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting cultivated crops are erosion and the depth to bedrock in areas of the Sunlight soil.

#### **Pasture and hay**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the slope, the low available water capacity of the Townley soil, and the very low available water capacity of the Sunlight soil.
- The slope increases the difficulty of properly

managing pastures and limits the use of these soils as hayland.

- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, seedling mortality, windthrow hazard, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs may be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- Windthrow is a hazard in some areas because of the shallow root zone in the Sunlight soil.
- The windthrow hazard can be reduced by applying a carefully regulated thinning and salvage program.
- When establishing a new forest crop, the seedling mortality rate may be high because of the low available water capacity of the Townley soil and the very low available water capacity of the Sunlight soil.
- Slope aspect and the content of gravel in the surface layer should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.

- See table 10 for specific information concerning potential productivity and suggested trees to plant.

### **Wildlife habitat**

*Suitability:* Suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is fair in areas of the Townley soil.
- The potential for woodland wildlife habitat is good in areas of the Townley soil and fair in areas of the Sunlight soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the restricted permeability, clayey subsoil, low soil strength, shrink-swell potential, depth to bedrock, and slope.
- The depth to bedrock and the slope are limitations affecting most building site developments and sanitary facilities.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 7e

## **UUC—Urban land-Udorthents complex, 2 to 12 percent slopes**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Alluvial fans and stream terraces

*Size of areas:* 10 to 575 acres

*Major uses:* Urban uses

### ***Composition***

Urban land: 20 to 60 percent

Udorthents and similar components: 20 to 60 percent

Contrasting components: 10 to 30 percent

### ***Minor Components***

#### *Similar components:*

- Areas of severely eroded soils or gullied areas
- Borrow pits and areas of truncated soils where the native soil has been removed

#### *Contrasting components:*

- Undisturbed areas of Allen, Shady, Cobstone, Waynesboro, and Townley soils on stream terraces and uplands
- Small areas of Bloomington, Ketona, and Tupelo soils that are frequently or occasionally flooded

### ***Typical Profile***

#### **Urban land**

Urban land mostly consists of areas where the surface is covered by roads, streets, parking lots, commercial buildings, houses, and other types of impervious material. In places, the natural drainage pattern has been altered by a system of ditches and storm drains. The underlying soil material is not observable. A typical profile of Urban land is not given.

#### **Udorthents**

A typical profile is not given because Udorthents vary greatly.

### ***Properties and Qualities of Udorthents***

Soil properties and qualities are not given because Udorthents vary greatly.

### ***Use and Management***

#### **Urban development**

*Suitability:* Suited

Management measures and considerations follow.

#### *Site considerations:*

- The hazard of erosion is a major management concern during construction.
- A well designed erosion-control plan is needed.
- Erosion barriers, diversions, and rock-lined or vegetated waterways are important management practices.
- Timely establishment of vegetation in bare areas should be a priority.
- Plant species that can tolerate a wide range of soil conditions grow best.

- Providing a good seedbed, maintaining the proper fertility level, and mulching seeded areas help to establish a protective cover of vegetation.
- Intensive measures for establishing vegetation, such as hydroseeding and sodding, may be needed in problem areas.
- A layer of concrete, asphalt, coarse gravel, gabion stone, or riprap helps to control erosion in areas where vegetation cannot be established.
- The load-bearing strength, the shrink-swell potential, surface runoff, and storm drainage management are concerns affecting urban development.
- Differential settling is a management concern in some areas of fill material used as sites for dwellings, small commercial buildings, or local roads and streets.
- Proper compaction of fill material minimizes differential settling.

#### *Dwellings:*

- The slope is the major limitation affecting sites for dwellings.
- Landshaping helps to overcome the slope limitation on sites for dwellings.
- Designing buildings and structures so that they conform to the natural slope of the land reduces the need for landshaping.
- The shrink-swell potential of the Udorthents should be considered when footers and basements are designed.

#### *Sanitary facilities:*

- This map unit commonly is not suitable as a site for onsite subsurface sewage disposal.
- In most places access to a municipal sewage disposal system is needed.

#### *Lawns and landscaping:*

- The stoniness may be a limitation in areas used for lawns or golf fairways and if the soils are landscaped.
- Adding topsoil and maintaining the proper fertility level help to establish ground cover.

#### *Small commercial buildings:*

- The slope is the major limitation affecting small commercial buildings.
- Landshaping helps to overcome the slope on sites for small commercial buildings.
- Designing buildings and structures so that they conform to the natural slope of the land reduces the need for landshaping.
- The shrink-swell potential of Udorthents should be considered when footers are designed.

*Local roads and streets:*

- The low soil strength and the slope are limitations on sites for local roads and streets.
- Adding gravel or other suitable subgrade material helps to prevent the road damage caused by the low soil strength.
- Designing roads so that they follow the natural contour and landshaping help to overcome the slope limitation.
- The shrink-swell potential in the subsoil should be considered when local roads are planned and designed.
- Onsite investigation is needed to determine the limitations affecting any proposed use.

**Interpretive Group**

*Land capability classification:* None assigned

**W—Water**

This map unit consists of areas inundated with water for most of the year. It generally includes rivers, lakes, and ponds. The Tennessee River, Watts Bar Lake, and Chickamauga Lake are the largest areas of water in Rhea County.

No land capability classification is assigned to this map unit.

## **Wa—Wax-Rockdell complex, 0 to 3 percent slopes, occasionally flooded**

**Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Flood plains, drainageways, terraces, and toeslopes

*Size of areas:* 5 to 245 acres

*Major uses:* Woodland, pasture, and hay

**Composition**

Wax soil and similar inclusions: 45 to 55 percent

Rockdell soil and similar inclusions: 30 to 45 percent

Contrasting components: 5 to 25 percent

**Minor Components***Similar components:*

- Intermingled areas of soils that have fewer rock fragments throughout than the Wax and Rockdell soils

*Contrasting components:*

- Areas of Tasso and Minvale soils on footslopes and stream terraces
- Intermingled areas of Hamblen soils

**Typical Profile****Wax***Surface layer:*

0 to 4 inches—brown very friable gravelly loam

*Subsurface layer:*

4 to 9 inches—dark yellowish brown very friable gravelly loam

*Subsoil:*

9 to 17 inches—yellowish brown friable gravelly clay loam

17 to 28 inches—yellowish brown friable gravelly clay loam that has strong brown mottles

28 to 46 inches—yellowish brown friable very gravelly clay loam that has strong brown, pale brown, and light brownish gray mottles

46 to 72 inches—brownish yellow, red, and strong brown firm very gravelly clay that has light gray mottles

**Rockdell***Surface layer:*

0 to 10 inches—brown very friable gravelly loam

*Subsoil:*

10 to 18 inches—yellowish brown friable gravelly loam

18 to 29 inches—yellowish brown friable extremely gravelly loam

*Substratum:*

29 to 41 inches—light yellowish brown friable very gravelly loam

*Buried subsoil:*

41 to 60 inches—strong brown friable very cobbly clay loam that has light gray and yellowish red mottles

**Soil Properties and Qualities**

*Drainage class:* Wax—moderately well drained; Rockdell—well drained

*Permeability:* Wax—slow; Rockdell—moderate or moderately rapid

*Available water capacity:* Wax—low; Rockdell—moderate

*Seasonal high water table:* Wax—between depths of 18 and 36 inches; Rockdell—between depths of 42 and 60 inches in winter and early spring

*Flooding:* Occasional

*Soil reaction:* Wax—very strongly acid or strongly acid; Rockdell—moderately acid or slightly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concerns in areas used for cultivated crops are the moderately deep root zone, the low available water capacity, and the wetness in areas of the Wax soil.
- In addition, the moderate available water capacity is a concern in areas of the Rockdell soil.
- Some crops may be damaged by the flooding in winter and early spring.
- The wetness delays planting and harvesting in some years.
- The gravelly surface layer may restrict tillage operations.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Poorly suited

*Management measures and considerations:*

- These soils have few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soils are wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Suited

*Management measures and considerations:*

- These soils have few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- When establishing a new forest crop, the seedling mortality rate may be high because of the gravelly surface layer.

- The content of gravel in the soil should be carefully considered when selecting planting sites for seedlings.
- Reinforcement plantings can be made until the desired stand is attained.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland wildlife habitat is good in areas of the Wax soil and fair in areas of the Rockdell soil.
- The potential for woodland wildlife habitat is poor areas of the Wax soil and fair in areas of the Rockdell soil.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Unsited

*Management measures and considerations:*

- The main limitations affecting urban uses are the flooding and wetness.
- The gravel and cobbles throughout the soil cause problems in areas used for lawns and if the soils are landscaped or used as a source of topsoil material.
- The flooding and wetness are difficult to overcome.
- A suitable alternative site should be selected.

### ***Interpretive Group***

*Land capability classification:* 3w

## **WbB2—Waynesboro loam, 2 to 5 percent slopes, eroded**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* High terraces and uplands

*Size of areas:* 5 to 110 acres

*Major uses:* Cropland, pasture, and hay

### **Composition**

Waynesboro soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

#### *Similar components:*

- Scattered areas of Dewey and Fullerton soils on ridge crests and side slopes
- Scattered areas of Etowah and Holston soils in landscape positions similar to those of the Waynesboro soil
- Waynesboro soils that have a surface layer of silt loam or loam

#### *Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Isolated areas of Talbott soils
- Intermingled areas of very gravelly soils

### **Typical Profile**

#### *Surface layer:*

0 to 5 inches—dark brown friable loam

#### *Subsurface layer:*

5 to 11 inches—dark brown friable clay loam

#### *Subsoil:*

11 to 25 inches—dark reddish brown friable clay

25 to 37 inches—yellowish red friable clay

37 to 65 inches—red friable clay that has brownish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- Terraces, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

#### *Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting urban uses.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for

local roads and streets or if the soil is used as a source of roadfill.

- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### ***Interpretive Group***

*Land capability classification:* 2e

## **WbC2—Waynesboro loam, 5 to 12 percent slopes, eroded**

### ***Setting***

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* High terraces and uplands

*Size of areas:* 5 to 170 acres

*Major uses:* Cropland, pasture, and hay

### ***Composition***

Waynesboro soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### ***Minor Components***

*Similar components:*

- Scattered areas of Dewey and Fullerton soils on ridge crests and side slopes
- Scattered areas of Etowah and Holston soils in landscape positions similar to those of the Waynesboro soil
- Waynesboro soils that have a surface layer of silt loam or loam

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Isolated areas of Talbott soils
- Intermingled areas of very gravelly soils

### ***Typical Profile***

*Surface layer:*

0 to 5 inches—dark brown friable loam

*Subsurface layer:*

5 to 11 inches—dark brown friable clay loam

*Subsoil:*

11 to 25 inches—dark reddish brown friable clay

25 to 37 inches—yellowish red friable clay

37 to 65 inches—red friable clay that has brownish yellow mottles

### ***Soil Properties and Qualities***

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink—swell potential:* Low

### ***Use and Management***

#### **Cropland**

*Suitability:* Suited

*Management measures and considerations:*

- This soil has few limitations affecting cropland.
- Erosion is a moderate hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A crop rotation that includes grasses and legumes helps to control erosion.
- Terraces, diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

### **Urban development**

*Suitability:* Suited

*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

### **Interpretive Group**

*Land capability classification:* 3e

## **WbD2—Waynesboro loam, 12 to 25 percent slopes, eroded**

### **Setting**

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* High terraces and ridge crests

*Size of areas:* 5 to 30 acres

*Major uses:* Cropland, pasture, and hay

### **Composition**

Waynesboro soil and similar components: 85 to 95 percent

Contrasting components: 5 to 15 percent

### **Minor Components**

*Similar components:*

- Scattered areas of Dewey and Fullerton soils on ridge crests and side slopes
- Scattered areas of Etowah and Holston soils in landscape positions similar to those of the Waynesboro soil
- Waynesboro soils that have a surface layer of silt loam or loam

*Contrasting components:*

- Narrow strips of Hamblen and Shady soils along drainageways and in depressions
- Isolated areas of Talbott soils
- Intermingled areas of very gravelly soils

### **Typical Profile**

*Surface layer:*

0 to 5 inches—dark brown friable loam

*Subsurface layer:*

5 to 11 inches—dark brown friable clay loam

*Subsoil:*

11 to 25 inches—dark reddish brown friable clay

25 to 37 inches—yellowish red friable clay

37 to 65 inches—red friable clay that has brownish yellow mottles

### **Soil Properties and Qualities**

*Drainage class:* Well drained

*Permeability:* Moderate

*Available water capacity:* High

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Low

### **Use and Management**

#### **Cropland**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main management concern is the hazard of erosion.
- Erosion is a severe hazard if a conventional tillage system is used.
- Conservation tillage, crop residue management, contour farming, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.
- A long-term crop rotation that includes grasses and legumes helps to control erosion.
- Diversions, grassed waterways, field borders, and filter strips help to control erosion and runoff.

**Pasture and hay***Suitability:* Suited*Management measures and considerations:*

- The main limitation is the slope.
- The slope increases the difficulty of properly managing pastures and limits the use of this soil as hayland.
- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

**Woodland***Suitability:* Suited*Management measures and considerations:*

- The main management concerns are the hazard of erosion, the equipment limitation, and plant competition.
- The hazard of erosion can be reduced by locating roads and trails as close to the contour as possible.
- Permanent access roads can be protected by spreading gravel on the road surface and installing water breaks and culverts.
- Temporary roads that are no longer used can be closed and protected by seeding and installing water breaks.
- Logging methods that minimize disturbance of the surface layer reduce the hazard of erosion.
- The slope generally is a limitation only when large, specialized equipment is used.
- Slopes generally are broken up enough or are short enough that conventional equipment can be used.
- In areas where slopes are long and unbroken, logs can be cabled or winched to adjacent areas that have smoother slopes and seedlings can be planted by hand.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

**Wildlife habitat***Suitability:* Well suited*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.

- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

**Urban development***Suitability:* Poorly suited*Management measures and considerations:*

- The main limitations are the moderate permeability, the clayey subsoil, the low soil strength, and the slope.
- The moderate permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site developments.
- The low soil strength may be a problem on sites for local roads and streets or if the soil is used as a source of roadfill.
- The slope is a limitation affecting most urban uses.
- Proper design, installation, and site preparation help to overcome some of the soil limitations.

***Interpretive Group****Land capability classification:* 4e**WfB—Wolftever silt loam, 2 to 5 percent slopes*****Setting****Physiographic area:* Southern Appalachian Ridges and Valleys*Landscape position:* Steam terraces*Size of areas:* 5 to 100 acres*Major uses:* Cropland, pasture, and hay***Composition***

Wolftever soil and similar components: 80 to 95 percent

Contrasting components: 5 to 20 percent

### **Minor Components**

#### *Similar components:*

- Scattered areas of Etowah and Holston soils
- Intermingled areas of Egam soils

#### *Contrasting components:*

- Intermingled areas of Altavista soils
- Small areas of Bloomingdale soils in depressions and along drainageways

### **Typical Profile**

#### *Surface layer:*

0 to 8 inches—dark yellowish brown friable silt loam

#### *Subsoil:*

8 to 24 inches—yellowish brown friable silty clay that has pale yellow mottles

24 to 38 inches—yellowish brown friable silty clay that has light gray mottles

38 to 46 inches—mottled yellowish brown, light gray, and strong brown firm silty clay

46 to 72 inches—yellowish brown firm silty clay that has gray mottles

### **Soil Properties and Qualities**

*Drainage class:* Moderately well drained

*Permeability:* Moderately slow

*Available water capacity:* High

*Seasonal high water table:* Between depths of 24 and 40 inches

*Flooding:* None

*Soil reaction:* Very strongly acid or strongly acid

*Depth to bedrock:* More than 60 inches

*Shrink-swell potential:* Moderate

### **Use and Management**

#### **Cropland**

*Suitability:* Well suited

*Management measures and considerations:*

- The main limitation is the flooding.
- The wetness delays planting and harvesting in some years.
- Conservation tillage, crop residue management, and cover crops help to control erosion, increase the rate of water infiltration, and maintain soil tilth.

#### **Pasture and hay**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting the management of pasture and hayland.
- The deferment of grazing when the soil is wet minimizes compaction and damage to the stand and helps to prevent excessive runoff.

- Proper stocking rates, pasture rotation, deferred grazing, and a well planned clipping and harvesting schedule are important management practices.
- Maintaining the proper fertility level and an adequate stand can help to increase production and reduce the runoff rate.

#### **Woodland**

*Suitability:* Well suited

*Management measures and considerations:*

- This soil has few limitations affecting forestland management.
- When establishing a new forest crop, the seedling mortality rate may be high because of the high water table.
- Reinforcement plantings can be made until the desired stand is attained.
- Plant competition from undesirable species may be a problem when establishing a new forest crop.
- Proper site preparation helps to control the plant competition that may occur immediately after planting.
- Undesirable plants can be controlled by cultivating, cutting, or applying herbicides.
- See table 10 for specific information concerning potential productivity and suggested trees to plant.

#### **Wildlife habitat**

*Suitability:* Well suited

*Management measures and considerations:*

- The potential for openland and woodland wildlife habitat is good.
- Habitat can be maintained or improved by providing food, cover, nesting areas, and den sites.
- Field borders and filter strips provide good wildlife habitat.
- Trees or shrubs in small areas and along fence rows can break up large, open areas and provide food and cover to wildlife.
- Buffer zones along streams benefit wildlife as well as control erosion.
- Brushy thickets can be established by clearing small areas in large tracts of mature woodland.
- Food plots or areas of green browse can be established along logging roads and trails.
- The habitat in areas of native plants can be improved by applying lime and fertilizer to the soil.
- Den trees should not be harvested.
- Brush piles or other nesting sites are needed.

#### **Urban development**

*Suitability:* Poorly suited

*Management measures and considerations:*

- The main limitations affecting urban uses are the wetness, the moderately slow permeability, the clayey subsoil, and the low soil strength.

- Special measures are needed to help overcome subsurface drainage problems.
- This soil is best suited to dwellings without basements.
- The moderately slow permeability and the clayey subsoil are limitations affecting some sanitary facilities and building site development.
- The low soil strength may be a problem on sites for

local roads and streets or if the soil is used as a source of roadfill.

- Proper design, installation, and site preparation help to overcome some of the soil limitations.

***Interpretive Group***

*Land capability classification: 2e*

# Use and Management of the Soils

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This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

## Crops, Pasture, and Hayland

Gregory L. Brann, Grazing Lands Specialist, Natural Resources Conservation Service, prepared this section.

General management needed for crops and

pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is discussed.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1996, more than 15,000 acres in Rhea County was used for crops and hay (26). The field crops suited to the soils and climate of Rhea County include burley tobacco, soybeans, corn, and wheat. The nearly level to sloping soils in the survey area generally are well suited to row crops. Most of the row crops are grown on uplands and old stream terraces because the acreage of bottomland is limited. The broad ridges and more nearly level areas are suitable for grain crops. The very deep, well drained soils, such as Etowah, Waynesboro, Dewey, and Fullerton soils, are suited to tobacco and alfalfa. The more sloping areas of Pailo, Fullerton, Townley, and Minvale soils are commonly used for hay and pasture. In addition to the land currently being cropped, some land that is idle, wooded, or pastured has potential for use as cropland. Food production could be increased considerably by applying soil and water conservation practices to cropland in the survey area. Information in this soil survey can facilitate the application of such technology.

## Managing Cropland

The management systems needed on cropland are those that protect or improve the soil, help to control erosion, and minimize the pollution of water by nutrients, soil particles, and pesticides carried in runoff. In Rhea County, soil erosion is a major hazard on most of the soils used for crops or pasture. It is a hazard where slopes are more than 2 percent. Dewey,

Fullerton, Waynesboro, and Minvale are examples of soils that have slopes of more than 2 percent. As the slope increases, the hazard of erosion and the difficulty in controlling erosion also increase.

Loss of the surface layer through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil, such as Dewey, Waynesboro, and Capshaw soils, and on soils that have a layer below the subsoil that limits the depth of the root zone, such as the bedrock in Townley, Lyerly, and Apison soils. Second, erosion on farmland results in the sedimentation of streams. Control of erosion minimizes this pollution and improves the quality of water for municipal use, recreation, and fish and wildlife.

In many sloping areas of clayey soils, preparing a good seedbed is difficult because the original friable surface layer has been eroded. This degree of erosion is common in areas of Dewey, Waynesboro, Etowah, and Fullerton soils. Erosion-control practices provide a protective surface cover, help to control runoff, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the surface for extended periods generally can keep soil losses to an amount that does not reduce the productivity of the soil. In sloping areas on livestock farms, sod-based crop rotations and the inclusion of forage crops of grasses and legumes in the cropping system help to control erosion. Forage crops can also add nitrogen and/or organic matter to the soil and improve soil tilth.

Minimizing tillage and leaving crop residue on the surface increase the rate of water infiltration and reduce the hazards of runoff and erosion (see table 5). These practices can be effective on most of the soils in the survey area. In the more sloping areas used for corn or double-cropped soybeans, no-till farming is effective in controlling erosion. It takes 3 to 5 years of conservation tillage before soil structure and weed control are improved and yields stabilize.

Terraces and diversions reduce the length of slopes and thus help to control runoff and erosion. They are most effective on deep and very deep, well drained soils that have long uniform slopes. These are expensive structures and are only recommended where conservation tillage and grassed waterways are not practical.

Contour farming and contour stripcropping help to control erosion. They are best suited to soils that have smooth, uniform slopes. Some field stripcropping is

done in areas that do not have smooth, uniform slopes. Although this is not as effective as contour stripcropping, it does help to reduce erosion and runoff.

Concentrated flow areas (drainageways) should be established and or maintained in permanent vegetation. It is important to install waterways with a uniform grade and parabola (bowl shape). Fertilizer and lime should be applied to the grassed waterways when the crop or pasture field is fertilized.

Soil wetness is a management concern on some soils in the county. Some areas of moderately well drained soils, such as Hamblen and Wolftever soils, are used for cropland but wetness delays planting or hinders harvesting operations in some years. Bloomingdale soils are poorly drained and are rarely used for crop production.

Many soils on uplands and stream terraces are very strongly acid to moderately acid unless limed. Applications of ground limestone are needed to raise the pH level sufficiently for the production of some crops. The levels of available phosphorus and potassium are naturally low in most of these soils. Additions of lime and fertilizer should be based on the results of a soil test, the needs of the crop, and a realistic yield expectation. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime needed and the proper method of application.

Some of the soils have a surface layer that is light in color and low in organic matter. A surface crust may form during periods of heavy rainfall. The crust is hard when dry and nearly impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and minimize crusting. Most of the cropland in the survey area consists of soils that are subject to erosion if they are plowed in the fall.

Eroded, clayey soils, such as some Waynesboro and Dewey soils, become cloddy if they are plowed outside a narrow range in optimum moisture content. Fall plowing on such soils generally results in better tilth in the spring. If plowing is done in the fall, fields should be plowed on the contour and drainageways should be maintained in permanent vegetation. Plowed ground should be left rough over the winter. The content and size of rock fragments impairs the tilth of some soils. Pailo and Rockdell soils and isolated areas of Fullerton soils may contain enough rock fragments that the use of tillage implements is impractical. Because tillage releases soil carbon, the organic matter content and water-holding capacity of the soil are reduced.

## Managing Pasture and Hayland

In 1997, there were about 12,000 beef and dairy cattle and calves in Rhea County. Most of the hayland and pasture in the county supports a mixture of grasses and legumes. Much of the hay is grown in rotation with pasture. Most of the harvested hay is rolled into round bales. Some higher quality hay is square baled or preserved as silage.

A successful livestock enterprise depends on a forage program that provides large quantities of good-quality feed. Such a program can provide most of the feed for beef and dairy cattle. Renovation, pasture rotation, proper fertility, the stockpiling of forages, and a well planned clipping and harvesting schedule are important forage management practices. Grazing can reduce cow cost by 50 to 65 percent. Grazing reduces the cost of harvesting, storage, and feeding hay; lengthens the grazing season; and improves harvest efficiency. Table 6 shows different grazing efficiencies for different rotational systems. Grazing heights should be maintained within the heights listed in table 7 for best production.

The nearly level and gently sloping, deep and very deep, well drained soils can be planted to the highest producing crops, such as corn silage, alfalfa, or a mixture of alfalfa and orchardgrass. Sod-forming grasses, such as tall fescue, minimize erosion in the steeper areas. Legumes can be established through renovation in areas that support sod-forming grasses.

Tall fescue is an important cool-season grass that is suited to a wide range of soil conditions. It is grown for both pasture and hay. The growth that occurs in the period of August through November is commonly permitted to accumulate in the field and is stockpiled for grazing late in fall and in winter. For maximum production, as much as 60 pounds of nitrogen fertilizer should be applied during the stockpiling period (September 1 through September 30). The rate of application should be based on the desired production level, date, and available moisture.

Warm-season grasses should be planted from April to June 15. Where weeds are a potential problem, they should be planted between June 1 and June 15. Warm-season forages help to alleviate the summer slump of cool-season grasses. They grow well during warm periods. Their greatest growth occurs from mid-June to September, which is the period when the growth of cool-season grasses is slow. Examples of warm-season grasses are introduced grasses, such as bermudagrass, Caucasian bluestem, crabgrass, pearl millet, and sudangrass hybrids, and native grasses, such as eastern gamagrass, switchgrass, big bluestem, and indiangrass.

Renovation with legumes can increase forage yields in areas that have a 50 percent stand of grass. Areas that have a grass stand of less than 50 percent should be reestablished to a grass-legume mixture. Stands that have greater than 50 percent stand of grass should be managed for grass only or the stand should be reduced to 50 percent through tillage or chemical treatment. Renovation involves partial destruction of the sod, applications of lime and fertilizer, and seeding of the desirable forage species. Adding legumes to grass stands provides higher quality feed. Legumes increase summer production and take nitrogen from the air. It is estimated that alfalfa can fix as much as 200 to 300 pounds of nitrogen per acre per year; red clover, 100 to 200 pounds; ladino clover, 100 to 150 pounds; and Korean lespedeza, 75 to 100 pounds.

Additional information about managing pasture and hayland can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

## Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 8. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the tables.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 8 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

## Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (37). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

*Capability classes*, the broadest groups, are designated by numerals 1 through 8. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have few limitations that restrict their use.

Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class 5 soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation.

Class 7 soils have very severe limitations that make them unsuitable for cultivation.

Class 8 soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e*, *w*, or *s*, to the class numeral, for example, 2*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

In class 1 there are no subclasses because the soils of this class have few limitations. The capability classification of each map unit is given in the section “Detailed Soil Map Units” and in table 8.

## Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 27,800 acres in the survey area, or about 14 percent of the total land acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, mainly in general

soil map units 1, 3, 4, and 7, which are described under the heading “General Soil Map Units.” Common crops grown on this land are corn for grain and silage, wheat and small grains for grain and silage, soybeans, alfalfa for hay, and other grasses and legumes for hay and pasture.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 9. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading “Detailed Soil Map Units.”

## Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (4, 11, 27, 28). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (6). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or a nonhydric soil, however, more specific information, such as information about the depth and duration of

the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (7). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in “Keys to Soil Taxonomy” (15) and in the “Soil Survey Manual” (14).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in “Field Indicators of Hydric Soils in the United States” (9).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

The following map units meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (9, 11).

At	Atkins loam, frequently flooded
Bm	Bloomington silty clay loam, frequently flooded
Cr	Cranmore loam, frequently flooded
Kt	Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded (Ketona part)

Map units that are made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The following map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

Ac	Allegheny-Cotaco complex, occasionally flooded
CaB	Capshaw silt loam, 2 to 5 percent slopes
Cb	Cobstone very stony loam, 0 to 3 percent slopes, rarely flooded
CDB	Cobstone-Shady-Urban land complex, 0 to 5 percent slopes, rarely flooded
CeC	Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky
Ha	Hamblen silt loam, occasionally flooded
Pp	Pope and Philo loams, frequently flooded
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded
WfB	Wolftever silt loam, 2 to 5 percent slopes

## Woodland Management and Productivity

Originally, all of Rhea County was forested. As the county was settled, much of the land was cleared for agricultural purposes. In 1989, about 126,400 acres were in forest. Of this total, 5,500 acres were federally owned, 44,000 acres were owned by individuals, 27,500 acres were part of farms, and 44,000 acres were owned or leased by the forest industry (26).

The soils in the county can produce good or excellent stands of commercial hardwood and pulpwood species. In most areas additional management is needed to achieve the best potential production. On better sites, plant competition from undesirable species is a major concern when establishing a new forest crop. Thinning out mature trees and undesirable species improves production on most established sites. Species conversion and increased stocking rates are also needed in some native areas to improve production. Protection from grazing and fire and control of disease and insects also can improve the stands.

The largest areas of forestland are in general soil map units 1, 2, 4, and 6, which are described in the section "General Soil Map Units." The common commercial species in the county are loblolly pine, shortleaf pine, and Virginia pine. Upland oaks, red maple, hickory, and yellow-poplar are dominant in areas of native forest.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. In addition to soils, elevation, aspect, and climate determine the kinds of trees that can be grown on a site.

The Natural Resources Conservation Service, the Tennessee Division of Forestry, or the Cooperative

Extension Service can help to determine specific forestland management needs.

Table 10 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed.

In table 10, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

*Erosion hazard* is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

*Equipment limitation* reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

*Seedling mortality* refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25

percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

*Windthrow hazard* is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

*Plant competition* ratings indicate the degree to which undesirable species are expected to invade and grow when openings are made in the tree canopy. The main factors that affect plant competition are depth to the water table and the available water capacity. A rating of *slight* indicates that competition from undesirable plants is not likely to prevent natural regeneration or suppress the more desirable species. Planted seedlings can become established without undue competition. A rating of *moderate* indicates that competition may delay the establishment of desirable species. Competition may hamper stand development, but it will not prevent the eventual development of fully stocked stands. A rating of *severe* indicates that competition can be expected to prevent regeneration unless precautionary measures are applied.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The first tree listed under *common trees* for a soil is the indicator species for that soil.

*Suggested trees to plant* are those that are suitable for commercial wood production.

## Recreation

Rhea County has many outdoor recreational facilities. Five natural or pocket wilderness areas are located in the county and have trails for hiking and rocks for climbing. These areas are Laurel-Snow Pocket Wilderness, Buzzard Point, Stinging Fork Pocket Wilderness, Twin Rocks Nature Trail, and Piney Falls. In 1998, Tennessee State Parks announced the creation of the Cumberland Trail State Park. This linear park is the only one of its kind in the State. Areas of Stinging Fork, Piney River, Twin Rocks, and Laurel-Snow are part of the overall trail project because the Cumberland Trail State Park contains segments of them (25). Walking trails, picnic areas, and playgrounds are included in four parks—two in Dayton, one in Graysville, and one in Spring City. Rhea Springs Park and Recreation Area is located in the northeastern part of the county. One golf course and one public pool are available. Excellent areas for boating, fishing, and water sports are provided by the county's two lakes on the Tennessee River—Chickamauga Lake and Watts Bar Lake. Two public hunting areas are located near the Tennessee River. The Chickamauga Wildlife Management Area and the Yuchi Refuge at Smith Bend are managed by the Tennessee Wildlife Resources Agency. Rules and regulations concerning the use of these areas change periodically.

Rhea County has high potential for most types of recreational development. Attention should be given to such soil characteristics as depth, permeability, texture, slope, and drainage when recreational enterprises are developed.

The soils of the survey area are rated in table 11 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 11, the degree of soil limitation is

expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome.

*Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 14 and interpretations for dwellings without basements and for local roads and streets in table 13.

*Camp areas* require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

*Playgrounds* require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

*Paths and trails* for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

*Golf fairways* are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use.

They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

## Wildlife Habitat

Michael E. Zeman, Biologist, Natural Resources Conservation Service, prepared this section.

Wildlife is an important natural resource of Rhea County. It provides a source of revenue, through sport hunting, and recreational opportunities, such as photography and fishing. Popular game species include bobwhite quail, cottontail rabbit, whitetail deer, mourning dove, gray squirrel, and fox squirrel.

The whitetail deer is the most popular game animal in the county. Deer populations are moderate and have grown considerably over the past 20 years. Harvest records from the Tennessee Wildlife Resources Agency (TWRA) indicate that essentially no deer were harvested in 1976 but nearly 1,900 deer were harvested in 1996. The eastern wild turkey was eliminated from the county by the 1950's but has since been reintroduced. Turkey populations remain low, but huntable populations now occur in the county due to the TWRA restoration program and management of the habitat. Over 100 birds were harvested in 2000. The number of bobwhite quail in the county is low. The highest populations of bobwhite quail are in areas where cropland is adjacent to brushy fencerows or idle areas of native warm-season grasses that provide cover. The cottontail rabbit population is moderate in the county. Good numbers occur across the county in areas where agricultural lands that are intermixed with low brushy cover provide the best habitat. The population of mourning dove is typically low in the county. Fall migrants of this game bird typically utilize crop fields, such as fields of corn, grain sorghum, and soybeans, or fields recently planted to wheat.

There are three species of squirrels in the county and all occur in good numbers. Both the gray squirrel and the primarily nocturnal southern flying squirrel occur in good to excellent numbers throughout the hardwood forests. The fox squirrel typically occurs in lower numbers and generally inhabits areas along woodland edges and woody fencerows near agricultural lands that are used for crop production. Squirrel populations vary greatly from year to year, depending on the production of hard mast, such as acorns, hickory nuts, and beechnuts. Waterfowl numbers are low in the county. The most common species migrating through the county include the wood duck, mallard, gadwall, and Canada goose. The

highest numbers typically occur along the Chickamauga and Watts Bar Reservoir or along the main watercourses that have associated wetland wildlife habitat. Upland farm ponds and small lakes are often used for resting and roosting. Several species of furbearers occur in the county. Wetland furbearers include mink, muskrat, and beaver. They can be found in moderate or high numbers along streams, small lakes, and farm ponds. Upland furbearers are common and abundant throughout the county. They include bobcat, opossum, raccoon, gray fox, striped skunk, and coyote.

Many nongame species occur in abundance throughout the county. Different species of songbirds, both resident and migratory, are associated with different plant communities. Woodland birds include the Carolina chickadee, tufted titmouse, pileated woodpecker, and warblers. Openland birds include robins, meadowlarks, and various sparrows. Common birds of prey include the red-tailed hawk, sparrow hawk, barred owl, and screech owl. Common reptiles and amphibians include the eastern box turtle, hognose snake, copperhead snake, bullfrog, and dusky salamander. Common small mammals include hispid cotton rats, moles, shrews, and other rodents. The relative abundance of nongame species is dependent upon the type and quality of habitat available.

State and federally listed threatened or endangered wildlife species that may occur in the county include several species of mussels and fish and several plants, including dwarf milkwort and prairie goldenrod. Rare species that may migrate through the county include the bald eagle and Bachman's sparrow. Other migrators include the peregrine falcon, osprey, sharp-shinned hawk, and Cooper's hawk.

Some of the soils in the county, such as the flatter areas of Wolftever, Dewey, Etowah, and Collegedale soils, have only slight or moderate limitations affecting the impoundment of water. Other soils, such as the steeper areas of Fullerton, Pailo, Capshaw, and Gilpin soils, may have severe limitations affecting sites for ponds because of the excessive slopes or the susceptibility to seepage. Most of the ponds in the county are used for livestock water, but many are also stocked with fish and can be used for recreational fishing. Common fish species that are stocked include largemouth bass, bluegill sunfish, and channel catfish. The water in ponds is typically acidic because of the pH of the majority of the soils. As a result, the production of fish may be limited. Few privately owned ponds are being intensively managed for the production of fish.

Rhea County has a total of about 106 miles of

warm-water streams, in addition to parts of Chickamauga and Watts Bar Reservoirs. Major streams of the county and tributaries to the Tennessee River include Roaring Creek, the Piney River, Whites Creek, and Richland Creek. These and other streams provide about 475 acres of aquatic habitat and support populations of largemouth bass, smallmouth bass, rock bass, bluegill, green sunfish, channel catfish, and several species of minnows and darters. Most of the streams are moderately productive with fair populations of warm-water fish. In the past there have been at least two commercial aquaculture operations in the county near Spring City. Fish species raised included channel catfish, rainbow trout, and various species of minnows. Overall, the topography renders much of the county unsuitable for extensive commercial pond construction. The most common aquifer that may provide adequate supplies of good-quality water is the East Tennessee Aquifer. This aquifer generally provides drinking water supplies within a depth of 300 feet, but the depth to large quantities of suitable water that may be needed for aquaculture production remains unclear. There are some outcrop springs associated with this aquifer.

Excluding artificial wetlands, such as upland farm ponds, there are several acres of natural wetlands in the county. In the 1980's, the State of Tennessee estimated that there were about 2,300 acres of wetlands in Rhea County. Most of the natural wetlands are along stream courses that have native plant communities consisting of herbaceous vegetation. A few bottomland hardwood wetlands remain, and these provide some of the most productive wildlife habitat in the county. The bottomland hardwoods improve the water quality of streams by removing nutrients and trapping sediment from upland runoff, lowering water temperatures through providing shade, and providing leaf litter that serves as the foundation for aquatic food chains.

Conservation practices improve or provide quality wildlife habitat. On cropland, planned crop rotations and crop residue management provide food and winter cover for many species of wildlife. On grasslands, deferred grazing of livestock and fencing help to protect food plots and nesting cover and also help to protect fish habitat through providing streambank protection. Field borders, filter strips, and forested riparian buffers along streams help to protect water quality and provide food, cover, and travel lanes for many species of wildlife. Native, tall, warm-season grasses are the most beneficial for these types of areas. Selective thinning of woodlands should be carried out in a manner that protects den trees and the best mast-producing trees. Other practices that

can improve wildlife habitat include upland wildlife habitat management, wetland wildlife habitat management, fish pond management, prescribed grazing, livestock exclusion, and woodland improvement. Conversely, some practices are harmful to wildlife. The most common practices include indiscriminate burning, indiscriminate use of pesticides, heavy grazing, complete clean mowing in the growing (nesting) season, clean fall plowing, extensive clearcutting of timber, draining and clearing of wetlands, and removal of den and all mast-producing trees.

Technical assistance in the planning or application of wildlife conservation practices can be obtained from the Natural Resources Conservation Service; the University of Tennessee, Agricultural Extension Service; the Tennessee Wildlife Resources Agency; or the Tennessee Division of Forestry.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting the appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are timothy, orchardgrass, annual lespedeza, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are common ragweed, goldenrod, beggarweed, partridge pea, common pokeweed, broom sedge, switchgrass, and big bluestem.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated good are silky dogwood, wild plum, and crabapple.

*Coniferous plants* furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction,

salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and cattails.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by embankments, dikes, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and a variety of nongame birds.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

## Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils*

*or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

## Building Site Development

Table 13 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if

soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling, can cause the movement of footings. A high water table, depth to bedrock, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

## Sanitary Facilities

Table 14 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 14 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and

gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 14 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, and large stones.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

*Sanitary landfills* are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 14 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation

rated slight or moderate may not be valid. Onsite investigation is needed.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

## Construction Materials

Table 15 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as *probable* or *improbable* sources of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. Table 17 shows the engineering index properties and provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The

thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

*Sand* and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in table 17, which shows the engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

*Topsoil* is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by such properties as soil reaction, available water capacity, and fertility. The

ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, and bedrock.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

## Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other

permeable material. Excessive slope can affect the storage capacity of the reservoir area.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders. A high water table affects the amount of usable material. It also affects trafficability.

*Aquifer-fed excavated ponds* are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability of the aquifer. Depth to bedrock and the content of large stones affect the ease of excavation.

*Drainage* is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water

movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditch banks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage may be adversely affected by acidity. Availability of drainage outlets is not considered in the ratings.

*Irrigation* is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone and soil reaction.

*Terraces and diversions* are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

*Grassed waterways* are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.



# Soil Properties

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Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

## Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

*Depth* to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

*Texture* is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (2) and the system adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to

properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

*Rock fragments* larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit and plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

## Physical and Chemical Properties

Table 18 shows estimates of some characteristics and features that affect soil behavior. These estimates

are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

*Soil reaction* is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 18, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

*Moist bulk density* is the weight of soil (oven dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at  $1/3$ - or  $1/10$ -bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Permeability* refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity ( $K_{sat}$ ). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

*Available water capacity* refers to the quantity of

water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Linear extensibility* refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at  $1/3$ - or  $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

*Erosion factors* are shown in table 18 as the K factor ( $K_w$  and  $K_f$ ) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the

more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor Kw* indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

*Erosion factor Kf* indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

## Soil Features

Table 19 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical or chemical properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, and dense layers. The table indicates the hardness of the restrictive layer, which significantly affects the ease of excavation.

*Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel or concrete in installations that are entirely within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

## Water Features

Table 20 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

*Water table* refers to a saturated zone in the soil. Table 20 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

*Flooding* is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

*Duration* and *frequency* are estimated. Duration is

expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is

less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (15, 16). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

**ORDER.** Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Paleudults (*Pale*, meaning old, plus *udult*, the suborder of the Ultisols that has a udic moisture regime).

**SUBGROUP.** Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that

typifies the great group. An example is Typic Paleudults.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, reaction, and clay activity. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, kaolinitic, thermic Typic Paleudults.

**SERIES.** The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

## Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (14). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (16) and in "Keys to Soil Taxonomy" (15). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

### *Allegheny Series*

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Footslopes, stream terraces, and alluvial fans

*Parent material:* Alluvium and colluvium from sandstone, siltstone, and shale

*Slope range:* 0 to 3 percent

*Associated soils:* Cotaco soils in landform positions similar to those of the Allegheny soils; Atkins, Pope, and Philo soils on adjacent flood plains

*Taxonomic class:* Fine-loamy, mixed, semiactive, mesic Typic Hapludults

### Typical Pedon

Allegheny loam in an area of Allegheny-Cotaco complex, occasionally flooded; in Morgan County, Tennessee; on a stream terrace in a field on the north bank of the Emory River, about 300 feet south of Macedonia Church and 6 miles east of Gobey; USGS Gobey Quadrangle:

Ap—0 to 6 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; few fine roots; moderately acid; gradual smooth boundary.

BE—6 to 12 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; few fine roots; few fine tubular pores; strongly acid; gradual smooth boundary.

Bt1—12 to 21 inches; dark yellowish brown (10YR 4/6) clay loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores; few faint clay films on faces of pedis; strongly acid; gradual smooth boundary.

Bt2—21 to 36 inches; dark yellowish brown (10YR 4/6) gravelly clay loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores and few vesicular pores; few faint clay films on faces of pedis; 15 percent sandstone gravel as much as 2 inches across; strongly acid; gradual smooth boundary.

BC—36 to 48 inches; yellowish brown (10YR 5/6) gravelly clay loam; weak fine subangular blocky structure; friable; many fine and medium tubular pores; 15 percent sandstone gravel as much as 2 inches across; strongly acid; clear smooth boundary.

C—48 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; massive; very friable; 35 percent sandstone gravel as much as 3 inches across; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 30 to more than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Commonly gravel of sandstone and shale

*Reaction:* Extremely acid to strongly acid, except in limed areas

### Ap horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 15 percent

### BE horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 8

Texture—loam or silt loam

Content of rock fragments—0 to 15 percent

### Bt horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 to 8

Mottles and redoximorphic features (if they occur)—mottles in shades of yellow, red, or brown; iron depletions in shades of gray occur below the upper 24 inches in some pedons

Texture of the fine-earth fraction—loam, clay loam, or sandy clay loam

Content of rock fragments—0 to 30 percent

### BC horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 to 8

Mottles and redoximorphic features (if they occur)—mottles in shades of yellow, red, gray, or brown; iron depletions in shades of gray; iron and manganese concentrations, masses, and concretions in shades of brown, red, or black

Texture of the fine-earth fraction—loam, fine sandy loam, clay loam, or sandy clay loam

Content of rock fragments—0 to 35 percent

### C horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 8

Mottles and redoximorphic features (if they occur)—mottles in shades of yellow, red, or brown; iron depletions in shades of gray; iron and manganese concentrations, masses, and concretions in shades of brown, red, or black

Texture of the fine-earth fraction—sandy loam, loam, fine sandy loam, clay loam, or sandy clay loam

Content of rock fragments—0 to 35 percent

## Allen Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys; near the base of the Escarpment of the Cumberland Plateau and Mountains

*Position on the landform:* Footslopes and side slopes

*Parent material:* Colluvium and alluvium from sandstone and shale

*Slope range:* 2 to 25 percent

*Associated soils:* Jefferson, Bouldin, Gilpin, and Shady soils in landform positions similar to those of the Allen soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Typic Paleudults

### Typical Pedon

Allen loam, 5 to 12 percent slopes; in Rhea County, Tennessee; about 4.8 miles north of Spring City on U.S. Highway 27, about 0.8 mile northwest on Caywood Road, 300 feet north of Caywood Road, on a footslope in a pasture; USGS Spring City Quadrangle:

Ap—0 to 6 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; common fine roots; 2 percent rounded sandstone gravel; moderately acid; clear smooth boundary.

Bt1—6 to 30 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; 2 percent rounded sandstone gravel; strongly acid; clear wavy boundary.

Bt2—30 to 42 inches; yellowish red (5YR 5/8) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct clay films on faces of peds; 5 percent rounded sandstone gravel; very strongly acid; clear wavy boundary.

Bt3—42 to 48 inches; yellowish red (5YR 5/6) gravelly sandy clay loam; common medium faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very friable; common distinct clay films on faces of peds; 20 percent rounded sandstone gravel; very strongly acid; clear wavy boundary.

Bt4—48 to 56 inches; yellowish red (5YR 5/8) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common

distinct red (2.5YR 4/6) clay films on faces of peds; 5 percent subrounded soft sandstone gravel; very strongly acid; clear wavy boundary.

Bt5—56 to 72 inches; yellowish red (5YR 5/8) gravelly sandy clay loam; common medium distinct strong brown (7.5YR 5/6) and red (2.5YR 4/6) mottles; weak fine subangular blocky structure; friable; few distinct clay films on faces of peds; 20 percent subrounded soft sandstone gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone and shale

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*Ap horizon:*

Hue—10YR

Value—3 to 5

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 15 percent

*Bt horizon:*

Hue—2.5YR to 7.5YR

Value—4 to 6

Chroma—4 to 8

Mottles (if they occur)—in shades of red, brown, or yellow

Texture of the fine-earth fraction—clay loam, sandy clay loam, or loam; some horizons below a depth of about 36 inches are clay

Content of rock fragments—0 to 25 percent

## Altavista Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Stream terraces

*Parent material:* Alluvium

*Slope range:* 1 to 5 percent

*Associated soils:* Wolftever soils in landform positions similar to those of the Altavista soils; Hamblen soils on adjacent flood plains; Etowah, Holston, and Waynesboro soils on the higher stream terraces

*Taxonomic class:* Fine-loamy, mixed, semiactive, thermic Aquic Hapludults

### Typical Pedon

Altavista loam, 1 to 5 percent slopes; in Rhea County, Tennessee; about 3.8 miles east of Dayton on State Road 30, about 2.8 miles east on Cottonport Road, 0.8 mile south on a private gravel road to a field, about 500 feet north of the Tennessee River (Chickamauga Lake); USGS Big Spring Quadrangle:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—6 to 19 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; common fine flakes of mica; moderately acid; clear smooth boundary.

Bt2—19 to 27 inches; yellowish brown (10YR 5/8) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; common fine prominent dark brown (10YR 3/3) manganese masses in the matrix; common fine flakes of mica; moderately acid; clear smooth boundary.

Bt3—27 to 47 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common faint clay films on faces of peds; common coarse distinct dark brown (10YR 3/3) manganese masses in the matrix; common medium prominent grayish brown (10YR 5/2) iron depletions in the matrix; common fine flakes of mica; strongly acid; clear smooth boundary.

BC—47 to 58 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common coarse distinct dark brown (10YR 3/3) manganese masses in the matrix; common medium prominent grayish brown (2.5Y 5/2) iron depletions in the matrix; common fine flakes of mica; strongly acid; clear smooth boundary.

C—58 to 72 inches; yellowish brown (10YR 5/6) loam; massive; friable; common fine faint strong brown (7.5YR 5/6) iron masses in the matrix; common coarse prominent gray (N 6/0) iron depletions in the matrix; common fine flakes of mica; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 72 inches

*Depth to seasonal high water table:* 18 to 30 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone and chert

*Reaction:* Very strongly acid to moderately acid

#### *Ap horizon:*

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 15 percent

#### *Bt horizon:*

Hue—7.5YR or 10YR

Value—5 or 6

Chroma—6 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, or red and iron depletions in shades of brown, gray, or olive occur in the upper 24 inches of horizon

Texture—clay loam, sandy clay loam, or loam

Content of rock fragments—0 to 5 percent

#### *BC horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—6 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, or red; iron depletions in shades of brown, gray, or olive

Texture of the fine-earth fraction—clay loam, sandy clay loam, or loam

Content of rock fragments—0 to 30 percent

#### *C horizon:*

Hue—7.5YR or 10YR

Value—5 or 6

Chroma—6 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, or red; iron depletions in shades of brown, gray, or olive

Texture of the fine-earth fraction—clay loam, sandy clay loam, sandy loam, or loam

Content of rock fragments—0 to 30 percent

## Apison Series

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Side slopes and backslopes

*Parent material:* Residuum from interbedded

sandstone, shale, and siltstone that has some influence from limestone and dolomite

*Slope range:* 25 to 65 percent

*Associated soils:* Sunlight and Salacoa soils in the same landform positions as the Apison soils; Townley and Salacoa soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Typic Hapludults

### Typical Pedon

Apison channery silt loam in an area of Apison-Sunlight-Salacoa complex, 25 to 60 percent slopes; in Rhea County, Tennessee; about 7.1 miles east of Dayton on State Road 30, about 4.2 miles north on State Road 302, about 1.8 miles east on Breedenton Ferry Road, 0.5 mile north on Smith Bend Road, 750 feet southeast of Smith Bend Road; USGS Decatur Quadrangle:

Oi—1 inch to 0; slightly decomposed hardwood litter.

A—0 to 5 inches; brown (10YR 4/3) channery silt loam; moderate medium granular structure; very friable; many fine and medium and few coarse roots; 21 percent shale channers and gravel; strongly acid; clear wavy boundary.

Bt1—5 to 23 inches; dark yellowish brown (10YR 4/6) channery silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; few distinct clay films on faces of pedis; 30 percent shale channers; strongly acid; clear wavy boundary.

Bt2—23 to 37 inches; strong brown (7.5YR 4/6) channery loam; weak fine subangular blocky structure; friable; few medium and coarse roots; few distinct clay films on faces of pedis; 23 percent shale channers; moderately acid; abrupt irregular boundary.

Cr—37 to 60 inches; soft brownish shale and siltstone.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to soft bedrock:* 20 to 40 inches

*Depth to hard bedrock:* More than 60 inches

*Size and kind of rock fragments:* Channers and gravel of sandstone and shale

*Reaction:* Very strongly acid to moderately acid

*A horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 or 4

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—2 to 25 percent

*Bt horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 to 6

Mottles (if they occur)—in shades of red, yellow, or brown; many are lithochromic

Texture of the fine-earth fraction—loam, clay loam, silt loam, or silty clay loam

Content of rock fragments—2 to 35 percent

*Cr horizon:*

Texture and color—brown to olive yellow soft shale and siltstone

The Apison soils in Rhea County are considered taxadjuncts to the Apison series because they have higher base saturation immediately above the paralithic contact than is typical for the series. This difference, however, does not significantly affect the use and management of the soils.

## Atkins Series

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Flood plains

*Parent material:* Mixed alluvium from soils that formed in sandstone, siltstone, and shale

*Slope range:* 0 to 2 percent

*Associated soils:* Allegheny and Cotaco soils on adjacent footslopes and drainageways; Pope and Philo soils in landform positions similar to those of the Atkins soils

*Taxonomic class:* Fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts

### Typical Pedon

Atkins loam, frequently flooded; in Cumberland County, Tennessee; about 2.1 miles west of Highway 68 on Grassy Cove Road, 200 feet south of the road; USGS Grassy Cove Quadrangle:

Oi—1 inch to 0; partially decomposed grass, sedge stems, and leaves.

Ap—0 to 10 inches; dark gray (10YR 4/1) loam; moderate medium granular structure; friable; many fine and very fine roots; many reddish iron accumulations lining root channels; moderately acid; clear smooth boundary.

Bg1—10 to 20 inches; dark gray (10YR 4/1) loam; weak medium subangular blocky structure; friable; common fine roots; few small manganese

concretions; many reddish iron accumulations lining root channels; very strongly acid; gradual smooth boundary.

Bg2—20 to 30 inches; grayish brown (10YR 5/2) loam; weak coarse subangular blocky structure; friable; common very fine roots; few small manganese concretions; common reddish iron accumulations lining root channels and in the matrix; very strongly acid; gradual smooth boundary.

Bg3—30 to 36 inches; light brownish gray (10YR 6/2) clay loam; weak coarse subangular blocky structure; friable; few very fine roots; few manganese concretions; common medium prominent yellowish brown (10YR 5/6) iron concentrations; very strongly acid; gradual smooth boundary.

Bg4—36 to 52 inches; gray (10YR 6/1) clay loam; weak coarse subangular blocky structure; friable; many fine and medium prominent brownish yellow (10YR 6/8) iron concentrations; very strongly acid; gradual smooth boundary.

C—52 to 60 inches; gray (10YR 6/1) sandy loam; massive; friable; very strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 10 to 55 inches

*Depth to bedrock:* More than 72 inches

*Depth to reduced matrix:* Less than 12 inches

*Size and kind of rock fragments:* Mostly rounded or subrounded gravel of sandstone

*Reaction:* Strongly acid or very strongly acid

#### *Ap horizon:*

Hue—10YR

Value—4 or 5

Chroma—1 or 2

Texture—loam

Content of rock fragments—0 to 5 percent

#### *Bg horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—1 or 2

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, red, or black; iron depletions in shades of gray or olive

Texture—loam, silt loam, or clay loam

Content of rock fragments—0 to 15 percent

#### *C horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—1 or 2

Redoximorphic features—iron and manganese

masses and concretions in shades of brown, yellow, red, or black; iron depletions in shades of gray or olive

Texture of the fine-earth fraction—loam or sandy loam

Content of rock fragments—0 to 40 percent

### **Barfield Series**

*Depth class:* Shallow

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low ridges and upland flats and side slopes

*Parent material:* Residuum from limestone

*Slope range:* 10 to 40 percent

*Associated soils:* Lyerly, Capshaw, Colbert, and Conasauga soils and areas of limestone rock outcrop

*Taxonomic class:* Clayey, mixed, active, thermic Lithic Hapludolls

#### Typical Pedon

Barfield flaggy silty clay in an area of Barfield-Rock outcrop complex, 10 to 40 percent slopes; in Rhea County, Tennessee; about 303 miles east of Dayton on State Road 30, about 3.9 miles south on New Union Road, 400 feet southwest of New Union Road; USGS Big Spring Quadrangle:

A—0 to 6 inches; dark olive brown (2.5YR 3/3) flaggy silty clay; moderate medium granular structure; friable; many fine roots; 15 percent limestone flagstones and channers; slightly acid; abrupt smooth boundary.

Bw—6 to 12 inches; olive brown (2.5Y 4/4) flaggy clay; moderate medium angular blocky structure; firm; common fine roots; 20 percent limestone flagstones and channers; neutral; abrupt smooth boundary.

BC—12 to 15 inches; olive brown (2.5Y 4/4) flaggy clay; common medium dark yellowish brown (10YR 4/6) mottles; weak medium angular blocky structure; firm; few fine roots; 30 percent limestone flagstones and channers; neutral; abrupt smooth boundary.

R—15 to 19 inches; hard limestone bedrock.

#### Range in Characteristics

*Thickness of the solum:* 8 to 20 inches

*Depth to bedrock:* 8 to 20 inches

*Size and kind of rock fragments:* Channers and

flagstones of limestone and, in places, chert gravel

*Reaction:* Slightly acid to slightly alkaline

*A horizon:*

Hue—10YR or 2.5Y

Value—2 or 3

Chroma—2 or 3

Texture of the fine-earth fraction—silty clay

Content of rock fragments—5 to 25 percent

*Bw horizon:*

Hue—10YR or 2.5Y

Value—2 to 4

Chroma—2 to 4

Mottles—in shades of red, yellow, brown, or gray

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—5 to 25 percent

*BC horizon:*

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—4 to 6

Mottles—in shades of red, yellow, brown, or gray

Texture of the fine-earth fraction—clay or silty clay

Content of rock fragments—5 to 25 percent

## **Bethesda Series**

*Depth class:* Deep and very deep

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Ridges and side slopes

*Parent material:* Acid regolith from surface mine operations

*Slope range:* 10 to 80 percent

*Associated soils:* Lily and Lonewood soils on adjacent side slopes and ridges; Gilpin, Jefferson, Shelocta, and Bouldin soils on adjacent side slopes

*Taxonomic class:* Loamy-skeletal, mixed, active, acid, mesic Typic Udorthents

### **Typical Pedon**

Bethesda channery loam in an area of Bethesda-Mine pits complex, 10 to 80 percent slopes; in Cumberland County, Tennessee; about 1.3 miles south of the Grassy Cove community on Highway 68, about 300 feet southwest of the road; USGS Grassy Cove Quadrangle:

A—0 to 2 inches; dark grayish brown (10YR 4/2) channery loam; weak medium granular structure; friable; 20 percent dark shale and coal fragments

less than 3 inches in diameter; very strongly acid; clear smooth boundary.

C1—2 to 23 inches; brown (10YR 4/3) very channery loam; massive; friable; 40 percent dark shale and coal fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

C2—23 to 38 inches; dark yellowish brown (10YR 4/4) very channery clay loam; massive; friable; 40 percent dark shale and coal fragments less than 3 inches in diameter; strongly acid; gradual smooth boundary.

C3—38 to 45 inches; yellowish brown (10YR 5/4) very channery loam; massive; friable; 50 percent shale fragments less than 3 inches in diameter; very strongly acid; gradual smooth boundary.

C4—45 to 60 inches; yellowish brown (10YR 5/4) cobbly loam; massive; friable; 25 percent sandstone fragments as much as 6 inches in diameter; very strongly acid.

### **Range in Characteristics**

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Commonly gravel, channers, flagstones, cobbles, and stones of sandstone, siltstone, shale, and coal

*Reaction:* Extremely acid to strongly acid, except in limed areas

*A horizon:*

Hue—7.5YR or 10YR

Value—3 to 6

Chroma—2 to 6

Texture of the fine-earth fraction—loam

Content of rock fragments—5 to 50 percent

*C horizon:*

Hue—7.5YR or 10YR

Value—3 to 6

Chroma—2 to 6

Texture of the fine-earth fraction—silty clay loam, loam, clay loam, or silt loam

Content of rock fragments—25 to 80 percent

## **Bloomingdale Series**

*Depth class:* Very deep

*Drainage class:* Poorly drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains and depressions

*Parent material:* Mixed alluvium from soils that formed in limestone and shale

*Slope range:* 0 to 2 percent

*Associated soils:* Hamblen soils on adjacent flood plains; Colbert and Capshaw soils on adjacent terraces and uplands

*Taxonomic class:* Fine, mixed, semiactive, nonacid, thermic Typic Endoaquepts

### Typical Pedon

Bloomingtondale silty clay loam, frequently flooded; in Rhea County, Tennessee; about 7.1 miles east of Dayton on State Road 30, about 4.2 miles north on State Road 302, about 1.5 miles east on Breedenton Ferry Road, 0.5 mile south on a field road, 700 feet east of the field road, along a drainageway; USGS Decatur Quadrangle:

A—0 to 6 inches; brown (10YR 4/3) silty clay loam; moderate medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

Bg1—6 to 21 inches; grayish brown (10YR 5/2) clay; moderate medium subangular blocky structure; friable; common fine and few coarse roots; common fine and medium distinct strong brown (7.5YR 5/8) iron accumulations on faces of peds; common fine and medium black (10YR 2/1) manganese masses and concretions in the matrix; slightly acid; clear smooth boundary.

Bg2—21 to 42 inches; gray (2.5Y 5/1) clay; weak medium subangular blocky structure; firm; few medium and coarse roots; common medium distinct yellowish brown (10YR 5/8) iron accumulations on faces of peds; common fine black (10YR 2/1) manganese masses and concretions in the matrix; slightly acid; clear smooth boundary.

Cg1—42 to 55 inches; greenish gray (10Y 5/1) clay; massive; firm; few very fine roots; common medium prominent yellowish brown (10YR 5/8) iron masses and concretions in the matrix; many fine and medium prominent black (10YR 2/1) manganese masses and concretions in the matrix; common fine flakes of mica; neutral; clear smooth boundary.

Cg2—55 to 63 inches; gray (2.5Y 6/1) clay; massive; firm; many medium prominent yellowish brown (10YR 5/6) iron masses and concretions in the matrix; few fine prominent black (10YR 2/1) manganese masses and concretions; common fine flakes of mica; neutral; clear smooth boundary.

Cg3—63 to 72 inches; gray (N 6/0) clay; massive; firm; many coarse prominent strong brown (7.5YR 5/6) iron masses and concretions in the matrix; common fine black (10YR 2/1) manganese

masses and concretions in the matrix; common fine flakes of mica; neutral.

### Range in Characteristics

*Thickness of the solum:* 14 to 40 inches

*Depth to bedrock:* More than 60 inches

*Depth to mottles with dominant chroma of 2:* Less than 12 inches

*Size and kind of rock fragments:* Mostly rounded or subrounded gravel of chert and shale

*Reaction:* Moderately acid to slightly alkaline

#### A horizon:

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—2 to 4

Redoximorphic features—iron and manganese masses and concretions in shades of yellow, brown, red, or black; iron depletions in shades of gray or olive

Texture—silty clay loam

Content of rock fragments—0 to 5 percent

#### Bg horizon:

Hue—10YR to 5Y or neutral

Value—5 or 6

Chroma—0 to 2

Redoximorphic features—iron and manganese masses and concretions in shades of yellow, brown, red, or black; a reduced matrix and iron depletions in shades of gray or olive

Texture—clay, silty clay, or silty clay loam

Content of rock fragments—0 to 5 percent

#### Cg horizon:

Hue—10YR to 5Y or neutral

Value—5 to 7

Chroma—0 to 2

Redoximorphic features—iron and manganese masses and concretions in shades of yellow, brown, red, or black; a reduced matrix and iron depletions in shades of gray or olive

Texture (general)—silty clay loam

Texture of the fine-earth fraction—clay, silty clay, or silty clay loam

Content of rock fragments—0 to 20 percent

### Bouldin Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains and Cumberland Escarpment

*Position on the landform:* Backslopes and footslopes

*Parent material:* Loamy and stony colluvium from sandstone, shale, and siltstone

*Slope range:* 25 to 80 percent

*Associated soils:* Allen and Jefferson soils in landform positions similar to those of the Bouldin soils; Gilpin and Petros soils on the upper and middle portions of backslopes

*Taxonomic class:* Loamy-skeletal, siliceous, subactive, mesic Typic Paleudults

### Typical Pedon

Bouldin cobbly loam in an area of Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony; in Morgan County, Tennessee; on an east-facing side slope on Jackson Mountain, 25 feet south of a logging road west of Poplar Creek, 1.2 miles from the end of an improved road in Magazine Hollow at the confluence of Poplar Creek and Big Mountain Creek, about 3.3 miles (airline) northwest of Oliver Springs; USGS Petros Quadrangle:

A—0 to 2 inches; very dark grayish brown (10YR 3/2) cobbly loam; weak fine granular structure; very friable; many fine medium and coarse roots; 20 percent sandstone cobbles and gravel as much as 8 inches across; very strongly acid; clear smooth boundary.

BE—2 to 6 inches; yellowish brown (10YR 5/6) cobbly loam; weak fine subangular blocky structure; very friable; many fine, medium, and coarse roots; 20 percent sandstone cobbles and gravel as much as 8 inches across; very strongly acid; clear smooth boundary.

Bt1—6 to 16 inches; strong brown (7.5YR 5/6) very cobbly loam; moderate fine subangular blocky structure; very friable; common fine and few medium roots; common distinct clay films; 35 percent sandstone cobbles and gravel as much as 10 inches across; very strongly acid; abrupt smooth boundary.

Bt2—16 to 40 inches; strong brown (7.5YR 4/6) very cobbly clay loam; moderate fine subangular blocky structure; friable; few fine and medium roots; many prominent clay films; 40 percent sandstone cobbles and gravel as much as 10 inches across; very strongly acid; gradual smooth boundary.

Bt3—40 to 64 inches; yellowish red (5YR 4/6) extremely gravelly clay loam; many fine prominent brownish yellow (10YR 6/6) mottles; coarse fine subangular blocky structure; firm; common prominent clay films; 40 percent sandstone gravel and 20 percent sandstone cobbles as much as 10 inches across; very strongly acid; clear smooth boundary.

BC—64 to 80 inches; variegated strong brown (7.5YR 4/6), brownish yellow (10YR 6/6), and yellowish red (5YR 5/8) cobbly loam; weak fine subangular blocky structure; firm; 15 percent sandstone cobbles and gravel as much as 10 inches across; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel, cobbles, stones, and boulders of sandstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### A horizon:

Hue—10YR

Value—3

Chroma—1 or 2

Texture of the fine-earth fraction—loam

Content of rock fragments—15 to 40 percent

#### BE horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 8

Texture of the fine-earth fraction—loam or sandy loam

Content of rock fragments—15 to 40 percent

#### Bt horizon:

Hue—2.5YR or 5YR

Value—4 or 5

Chroma—6 to 8

Texture of the fine-earth fraction—loam, clay loam, or sandy clay loam

Content of rock fragments—35 to 65 percent

#### BC horizon:

Hue—2.5YR or 5YR

Value—4 or 5

Chroma—6 to 8

Mottles—some horizons are mottled in shades of red, brown, or yellow

Texture of the fine-earth fraction—loam, clay loam, sandy loam, or sandy clay loam

Content of rock fragments—35 to 65 percent

## Capshaw Series

*Depth class:* Deep and very deep

*Drainage class:* Moderately well drained

*Permeability:* Very slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low terraces, drainageways, and upland flats

*Parent material:* Alluvium over residuum from interbedded argillaceous limestone and calcareous shale

*Slope range:* 2 to 12 percent

*Associated soils:* Colbert, Lyerly, and Conasauga soils and areas of limestone rock outcrop on uplands; Shady and Hamblen soils on adjacent flood plains and drainageways

*Taxonomic class:* Fine, mixed, semiactive, thermic Oxyaquic Hapludalfs

### Typical Pedon

Capshaw silt loam, 2 to 5 percent slopes; in Roane County, Tennessee; in a field on a west-facing footslope, 100 feet north of a driveway that is about 700 feet northeast of the intersection of Mays Valley Road and Old Harriman Highway, about 850 feet southwest of the community of Dyllis; USGS Elverton Quadrangle:

Ap—0 to 4 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; many fine and medium roots; neutral; abrupt smooth boundary.

BE—4 to 9 inches; brown (10YR 5/3) silty clay loam; weak fine subangular blocky structure; friable; many fine and medium roots; common medium tubular pores; slightly acid; clear smooth boundary.

Bt1—9 to 24 inches; brownish yellow (10YR 6/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine and few medium roots; common medium tubular pores; common distinct yellowish brown (10YR 5/4) clay films on faces of pedis and lining pores; common medium prominent black (10YR 2/1) manganese concretions in the matrix; common medium distinct strong brown (7.5YR 5/8) and pale brown (10YR 6/3) irregular iron masses on faces of pedis; slightly acid; clear wavy boundary.

Bt2—24 to 36 inches; brownish yellow (10YR 6/6) clay; moderate medium angular blocky structure; firm, moderately sticky, moderately plastic; few fine tubular pores; common distinct yellowish brown (10YR 5/4) clay films on faces of pedis and lining pores; many medium prominent black (10YR 2/1) manganese concretions in the matrix; common medium distinct strong brown (7.5YR 5/8) irregular iron masses in the matrix; common medium prominent light brownish gray (10YR 6/2) irregular iron depletions in the matrix; slightly acid; clear wavy boundary.

Bt3—36 to 53 inches; brownish yellow (10YR 6/6) silty clay; weak medium angular blocky structure; firm,

moderately sticky, moderately plastic; few fine tubular pores; common distinct yellowish brown (10YR 5/4) clay films on faces of pedis and lining pores; common medium prominent black (10YR 2/1) manganese concretions in the matrix; common medium distinct strong brown (7.5YR 5/8) irregular iron masses in the matrix; common medium prominent light brownish gray (10YR 6/2) irregular iron depletions in the matrix; slightly acid; clear wavy boundary.

BC—53 to 72 inches; brownish yellow (10YR 6/6) silty clay; weak coarse angular blocky structure; firm, moderately sticky, moderately plastic; 10 percent shale channers; many medium prominent black (10YR 2/1) manganese concretions in the matrix; many medium distinct strong brown (7.5YR 5/8) irregular iron masses and common medium prominent light brownish gray (10YR 6/2) irregular iron depletions in the matrix; slightly acid; abrupt smooth boundary.

Cr—72 to 76 inches; shale bedrock.

### Range in Characteristics

*Thickness of the solum:* 40 to 60 inches or more

*Depth to bedrock:* 40 to more than 72 inches

*Size and kind of rock fragments:* Gravel and channers of limestone, shale, and chert

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the Bt horizon, except in limed areas; slightly acid to slightly alkaline just above bedrock

#### Ap horizon:

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—3 to 6

Texture—silt loam

Content of rock fragments—0 to 10 percent

#### BE horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—silty clay loam, silty clay, or clay

Content of rock fragments—0 to 10 percent

#### Bt horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Redoximorphic features—manganese concretions and iron masses in shades of red, yellow, brown, or black; iron depletions in shades of gray occur below the upper 10 inches

Texture—silty clay loam, silty clay, or clay  
Content of rock fragments—0 to 10 percent

*BC horizon:*

Hue—7.5YR or 10YR  
Value—4 or 5  
Chroma—4 to 8  
Redoximorphic features—manganese concretions and iron masses in shades of red, yellow, brown, or black; iron depletions in shades of gray; some horizons are variegated without dominant hue or chroma  
Texture—silty clay loam, silty clay, or clay  
Content of rock fragments—0 to 10 percent

*Cr horizon:*

Texture—interbedded calcareous shale and limestone

## **Cobstone Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Southern Appalachian Ridges and Valleys and coves that cut into the Cumberland Plateau and Mountains and Cumberland Escarpment

*Position on the landform:* Alluvial fans and stream terraces

*Parent material:* Stony and cobbly alluvium mostly from sandstone with some siltstone and shale

*Slope range:* 0 to 3 percent

*Associated soils:* Allen soils on footslopes; Shady soils in landform positions similar to those of the Cobstone soils

*Taxonomic class:* Loamy-skeletal, siliceous, semiactive, thermic Typic Hapludults

### **Typical Pedon**

Cobstone cobbly fine sandy loam, rarely flooded; in Bledsoe County, Tennessee; about 1.0 mile south of College Station Mountain Road on Alvin C. York Highway, 350 feet west of the highway, 150 feet south of Cannon Creek; USGS Pikeville Quadrangle:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) cobbly fine sandy loam; weak medium granular structure; very friable; many fine and common medium roots; many fine tubular pores; about 25 percent sandstone cobbles and pebbles  $\frac{1}{8}$  inch to 5 inches across; strongly acid; clear wavy boundary.

BE—5 to 12 inches; strong brown (7.5YR 5/8) very cobbly fine sandy loam; weak medium and fine

subangular blocky structure; very friable; common fine and medium roots; many fine and common tubular pores; about 45 percent sandstone cobbles and gravel  $\frac{1}{8}$  inch to 8 inches across; strongly acid; gradual wavy boundary.

Bt1—12 to 28 inches; strong brown (7.5YR 4/6) extremely cobbly sandy clay loam; weak medium subangular blocky structure; very friable; few fine roots; common fine and medium tubular pores; few faint clay films on faces of peds and some weak bridging of sand grains; about 65 percent sandstone cobbles and pebbles  $\frac{1}{8}$  inch to 12 inches across; strongly acid; gradual wavy boundary.

Bt2—28 to 34 inches; strong brown (7.5YR 5/8) extremely cobbly fine sandy loam; weak fine subangular blocky structure; very friable; common fine and medium tubular pores; few faint clay films on faces of peds; about 75 percent sandstone cobbles and pebbles  $\frac{1}{8}$  inch to 12 inches across; very strongly acid; gradual wavy boundary.

BC—34 to 63 inches; yellowish brown (10YR 5/8) extremely cobbly sandy loam; weak fine subangular blocky structure; very friable; about 80 percent cobbles, pebbles, and stones  $\frac{1}{8}$  inch to 18 inches across; very strongly acid.

### **Range in Characteristics**

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Rounded cobbles, pebbles, and stones of sandstone

*Reaction:* Very strongly acid or strongly acid

*Ap horizon:*

Hue—10YR

Value—4

Chroma—2 to 4

Texture of the fine-earth fraction—fine sandy loam

Content of rock fragments—25 to 50 percent

*BE horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 8

Texture of the fine-earth fraction—loam, fine sandy loam, or sandy loam

Content of rock fragments—25 to 50 percent

*Bt and BC horizons:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 8

Texture of the fine-earth fraction—sandy loam, fine sandy loam, loam, or sandy clay loam

Content of rock fragments—35 to 80 percent

## Colbert Series

*Depth class:* Deep

*Drainage class:* Moderately well drained

*Permeability:* Very slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low upland ridges and flats

*Parent material:* Residuum from interbedded argillaceous limestone and calcareous shale

*Slope range:* 2 to 12 percent

*Associated soils:* Capshaw, Lyerly, and Conasauga soils and areas of limestone rock outcrop

*Taxonomic class:* Fine, smectitic, thermic Vertic Hapludalfs

### Typical Pedon

Colbert silty clay loam in an area of Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky; in Rhea County, Tennessee; about 3.8 miles east of Dayton on State Road 30, about 0.9 mile east on Cottonport Road, 0.3 mile south on Double S Road, 0.8 mile southeast on Purser Road, 750 feet east of Purser Road; USGS Big Spring Quadrangle:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium granular structure; friable; common fine roots; common fine prominent black (10YR 2/1) manganese concretions in the matrix; slightly acid; abrupt smooth boundary.

Bt1—6 to 17 inches; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; common fine roots; common distinct clay films on faces of peds; few fine and medium prominent black (10YR 2/1) and distinct brown (10YR 4/3) manganese and iron concretions in the matrix; 2 percent chert gravel; slightly acid; abrupt smooth boundary.

Bt2—17 to 26 inches; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; many distinct clay films on faces of peds; common fine and medium prominent black (10YR 2/1) manganese concretions in the matrix; many coarse distinct yellowish red (5YR 5/6) iron masses on faces of peds; 2 percent chert gravel; slightly acid; gradual smooth boundary.

Bt3—26 to 36 inches; yellowish brown (10YR 5/6) clay; moderate medium angular and subangular blocky structure; very firm, very sticky, very plastic; very few fine roots; common distinct clay films on faces of peds; few fine and medium distinct dark yellowish brown (10YR 4/4) iron-

manganese concretions in the matrix; many medium prominent red (2.5YR 4/6) iron masses on faces of peds; common medium prominent light brownish gray (2.5Y 6/2) iron depletions in the matrix; 2 percent chert gravel; neutral; gradual smooth boundary.

BC—36 to 46 inches; light olive brown (2.5Y 5/6) clay; weak coarse subangular blocky structure; very firm, very sticky, very plastic; few distinct clay films on faces of peds; many fine and medium prominent dark yellowish brown (10YR 4/4) iron-manganese masses and concretions in the matrix; common medium prominent yellowish red (5YR 5/8) iron masses on faces of peds; many coarse prominent light gray (2.5Y 7/2) iron depletions in the matrix; 2 percent chert gravel; neutral; abrupt smooth boundary.

C—46 to 63 inches; light olive brown (2.5Y 5/6) clay; massive; very firm, very sticky, very plastic; common distinct pressure faces; many fine and medium prominent dark yellowish brown (10YR 4/4) iron-manganese masses and concretions in the matrix; common medium prominent yellowish brown (10YR 5/8) iron masses in the matrix; common medium prominent light olive gray (5Y 6/2) iron depletions in the matrix; 10 percent chert and limestone gravel; neutral; abrupt smooth boundary.

R—63 inches; hard limestone bedrock.

### Range in Characteristics

*Thickness of the solum:* 40 to 60 inches

*Depth to bedrock:* 40 to more than 72 inches

*Size and kind of rock fragments:* Gravel and flagstones of limestone and chert

*Nodules, concretions, and masses of iron and manganese:* None or few in the A horizon; few to many in the Bt, BC, and C horizons

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the Bt horizon; slightly acid to slightly alkaline in the lower part of the Bt horizon and in the BC and C horizons

*Ap horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—2 to 4

Texture—silty clay loam

Content of rock fragments—0 to 10 percent

*Bt horizon:*

Hue—7.5YR to 2.5Y

Value—5 to 7

Chroma—4 to 8

Redoximorphic features—manganese and iron masses and concretions in shades of red, yellow, brown, or black; iron depletions in shades of gray or olive occur below the upper 10 inches

Texture—clay or silty clay

Content of rock fragments—0 to 10 percent

*BC and C horizons:*

Hue—7.5YR to 5Y

Value—5 or 6

Chroma—2 to 8

Redoximorphic features—manganese and iron masses and concretions in shades of red, yellow, brown, or black; iron depletions in shades of gray or olive

Texture—clay or silty clay

Content of rock fragments—0 to 15 percent

## **Collegedale Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridges, side slopes, and shoulder slopes

*Parent material:* Interbedded limestone and shale residuum

*Slope range:* 2 to 25 percent

*Associated soils:* Townley soils on adjacent, lower ridges; Capshaw soils in drainageways and on low terraces; Colbert and Lyerly soils on adjacent uplands

*Taxonomic class:* Fine, mixed, semiactive, thermic Typic Paleudults

### **Typical Pedon**

Collegedale silt loam, 2 to 12 percent slopes; in Hamilton County, Tennessee; in a field south of Grindstone Mountain between tributary forks of Wolftever Creek, 0.6 mile northwest of the intersection of Tallent Road and McDonald Road, about 1.6 miles (airline) northeast of Collegedale; USGS Ooltewah Quadrangle:

Ap—0 to 6 inches; brown (7.5YR 4/4) silt loam; moderate medium granular structure; friable; many fine roots; few chert pebbles less than 1 inch in diameter; strongly acid; abrupt smooth boundary.

Bt1—6 to 16 inches; yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; very firm; common fine roots; common distinct

clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 22 inches; yellowish red (5YR 5/6) clay; few fine and medium faint yellowish brown (10YR 5/6) and prominent olive yellow (2.5Y 6/6) mottles; moderate medium subangular blocky structure; very firm, plastic; few fine roots; common distinct clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—22 to 32 inches; yellowish red (5YR 5/8) clay; common medium and coarse prominent brownish yellow (10YR 6/6) and olive yellow (2.5Y 6/6) and distinct red (2.5YR 5/6) mottles; moderate medium angular blocky structure parting to moderate fine angular blocky; very firm, plastic; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt4—32 to 53 inches; yellowish red (5YR 5/8) clay; many medium and coarse distinct red (2.5YR 5/6), prominent light yellowish brown (10YR 6/4), and prominent olive yellow (2.5Y 6/6) mottles; moderate medium angular blocky structure parting to moderate fine angular blocky; very firm, plastic; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt5—53 to 80 inches; variegated yellowish red (5YR 5/6), light yellowish brown (10YR 6/4), red (2.5YR 5/6), light gray (10YR 7/2), and olive yellow (2.5Y 6/6) clay; weak medium subangular blocky structure; very firm, plastic; few faint clay films on faces of peds; strongly acid.

### **Range in Characteristics**

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and channers of chert and shale

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *Ap horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 or 4

Texture—silt loam

Content of rock fragments—0 to 10 percent

#### *Bt horizon:*

Hue—2.5YR or 5YR

Value—4 or 5

Chroma—6 to 8

Mottles—in shades of brown, yellow, or red

Texture—clay or silty clay

Content of rock fragments—0 to 10 percent

## Conasauga Series

*Depth class:* Moderately deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Upland ridges and side slopes

*Parent material:* Residuum from calcareous shale and shaly limestone

*Slope range:* 5 to 12 percent

*Associated soils:* Townley soils on the adjacent higher ridges; Capshaw soils on low stream terraces; Bloomingdale and Tupelo soils on adjacent flood plains and in drainageways

*Taxonomic class:* Fine, mixed, semiactive, thermic Oxyaquic Hapludalfs

### Typical Pedon

Conasauga silt loam, 5 to 12 percent slopes; in Rhea County Tennessee; about 2.6 miles south of Spring City on U.S. Highway 27 to the junction of State Road 68, about 1.9 miles south on State Road 68, about 0.9 mile north on Wolf Creek Road, 0.3 mile north on Old Rhea Springs Road, 150 feet west of Old Rhea Springs Road, in an area of mixed hardwood trees; USGS Spring City Quadrangle:

Ap—0 to 4 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; friable; many fine roots; 2 percent shale channers; moderately acid; clear smooth boundary.

Bt1—4 to 14 inches; yellowish brown (10YR 5/6) clay; common fine distinct brown (10YR 5/3) mottles in the matrix; moderate medium subangular blocky structure; firm; common medium and fine roots; common distinct clay films on faces of pedis; few fine black (10YR 2/1) manganese masses in the matrix; 2 percent shale channers; moderately acid; clear smooth boundary.

Bt2—14 to 20 inches; yellowish brown (10YR 5/6) clay; moderate medium subangular blocky structure; firm; few fine roots; common distinct clay films on faces of pedis; common fine prominent black (10YR 2/1) manganese masses in the matrix; common medium prominent red (2.5YR 4/6) iron masses on faces of pedis; common fine prominent olive gray (5Y 5/2) iron depletions in the matrix; 5 percent shale channers; moderately acid; clear smooth boundary.

Cg1—20 to 24 inches; light gray (10YR 7/2) clay; massive; firm; common fine and medium prominent black (10YR 2/1) manganese masses

and concretions in the matrix; many medium and coarse prominent yellowish red (5YR 5/6) iron masses in the matrix; 10 percent shale channers; slightly acid; clear smooth boundary.

Cg2—24 to 34 inches; grayish brown (2.5Y 5/2) clay; massive; firm; many coarse prominent black (10YR 2/1) manganese masses and concretions in the matrix; common medium prominent yellowish brown (10YR 5/6) iron masses in the matrix; common medium distinct light gray (10YR 7/1) iron depletions in the matrix; 10 percent shale channers; slightly acid; clear smooth boundary.

Cr—34 to 48 inches; soft brown and olive shale; 30 percent clay or silty clay fine-earth in interstitial areas; many black (10YR 2/1) manganese masses in cracks and covering rock fragments.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and channers of shale

*Reaction:* Strongly acid to slightly acid, except in limed areas

#### Ap horizon:

Hue—10YR or 2.5Y

Value—3 to 5

Chroma—3 or 4

Texture—silt loam

Content of rock fragments—0 to 5 percent

#### Bt horizon:

Hue—10YR or 2.5Y

Value—5 to 7

Chroma—6 to 8

Redoximorphic features—manganese and iron masses and concretions in shades of yellow, red, black, or brown; iron depletions in shades of gray or olive occur below the upper 10 inches of horizon

Texture—silty clay, clay, or, rarely, clay loam

Content of rock fragments—0 to 5 percent

#### Cg horizon:

Hue—10YR or 2.5Y

Value—4 to 7

Chroma—0 to 2

Redoximorphic features—manganese and iron masses and concretions in shades of yellow, red, black, or brown; iron depletions in shades of gray or olive

Texture of the fine-earth fraction—silty clay, clay, or, rarely, clay loam

Content of rock fragments—0 to 20 percent

*Cr horizon:*

Texture and color—soft brown and olive shale with clay or silty clay material filling cracks and interstitial areas

**Cotaco Series**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Footslopes and stream terraces

*Parent material:* Alluvium and colluvium from sandstone, shale, and siltstone

*Slope range:* 0 to 3 percent

*Associated soils:* Allegheny soils in landform positions similar to those of the Cotaco soils; Atkins, Pope, and Philo soils on adjacent flood plains; Lily, Lonewood, and Gilpin soils on adjacent uplands

*Taxonomic class:* Fine-loamy, mixed, active, mesic Aquic Hapludults

**Typical Pedon**

Cotaco loam in an area of Allegheny-Cotaco complex, occasionally flooded; in Morgan County, Tennessee; on a stream terrace in a field, on the north bank of the Emory River, about 500 feet southeast of Macedonia Church, about 6 miles east of Gobey; USGS Gobey Quadrangle:

Ap—0 to 4 inches; brown (10YR 4/3) loam; weak medium granular structure; very friable; few fine roots; moderately acid; gradual smooth boundary.

Bt1—4 to 13 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; friable; few fine roots; few fine tubular pores; strongly acid; gradual smooth boundary.

Bt2—13 to 24 inches; dark yellowish brown (10YR 4/6) loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—24 to 36 inches; yellowish brown (10YR 5/4) clay loam; moderate medium subangular blocky structure; friable; many fine and medium tubular pores and few vesicular pores; few faint clay films on faces of peds; common medium prominent yellowish red (5YR 5/6) iron concretions in the matrix; many medium distinct light brownish gray (10YR 6/2) depletions on faces of peds; strongly acid; gradual smooth boundary.

BC—36 to 45 inches; brownish yellow (10YR 6/6) gravelly loam; weak fine subangular blocky structure; friable; many fine and medium tubular pores; many medium prominent yellowish red (5YR 5/8) very weakly cemented iron nodules in the matrix; many medium prominent light brownish gray (10YR 6/2) irregular iron depletions in the matrix; 15 percent sandstone gravel as much as 2 inches across; strongly acid; clear smooth boundary.

Cg—45 to 60 inches; light brownish gray (10YR 6/2) very gravelly fine sandy loam; massive; very friable; common medium prominent strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) iron masses in the matrix; 50 percent sandstone gravel as much as 2 inches across; very strongly acid.

**Range in Characteristics**

*Thickness of the solum:* 30 to 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel of sandstone shale and siltstone

*Reaction:* Extremely acid to strongly acid, except in limed areas

*Ap horizon:*

Hue—10YR

Value—4 to 6

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 15 percent

*Bt horizon:*

Hue—5YR to 10YR

Value—4 to 6

Chroma—3 to 8

Redoximorphic features—iron nodules and masses in shades of red or brown; iron depletions in shades of gray occur in the upper 24 inches

Texture of the fine-earth fraction—loam, clay loam, or sandy clay loam

Content of rock fragments—0 to 25 percent

*BC horizon:*

Hue—5YR to 10YR

Value—4 to 6

Chroma—3 to 8

Redoximorphic features—iron nodules and masses in shades of red or brown; iron depletions in shades of gray

Texture of the fine-earth fraction—loam, clay loam, or sandy clay loam

Content of rock fragments—0 to 25 percent

*Cg horizon:*

Hue—7.5YR or 10YR or neutral

Value—4 to 8

Chroma—0 to 2

Redoximorphic features—iron nodules and masses in shades of red or brown; a reduced matrix in shades of gray; some horizons are variegated without dominant value or chroma

Texture of the fine-earth fraction—silt loam, loam, clay loam, sandy clay loam, or fine sandy loam

Content of rock fragments—2 to 50 percent

**Craigsville Series***Depth class:* Very deep*Drainage class:* Well drained*Permeability:* Moderately rapid*Physiographic area:* Cumberland Plateau and Mountains*Position on the landform:* Flood plains and alluvial fans*Parent material:* Alluvium*Slope range:* 0 to 5 percent*Associated soils:* Ealy soils in the same landform positions as the Craigsville soils; Jefferson, Shelocta, and Varilla soils on adjacent footslopes and alluvial fans*Taxonomic class:* Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts**Typical Pedon**

Craigsville cobbly fine sandy loam in an area of Ealy-Craigsville complex, occasionally flooded; in Cumberland County, Tennessee; on the flood plain of the Obed River west of Potters Ford Road, about 300 feet west of the confluence of Underwood Branch and the Obed River at Potters Ford; USGS Fox Creek Quadrangle:

A—0 to 3 inches; dark brown (10YR 3/3) cobbly fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; 30 percent sandstone cobbles and gravel as much as 8 inches across; strongly acid; clear smooth boundary.

AB—3 to 9 inches; brown (10YR 4/3) cobbly sandy loam; weak fine granular structure; friable; many fine to coarse roots; 30 percent sandstone cobbles and gravel as much as 8 inches across; strongly acid; clear smooth boundary.

Bw—9 to 21 inches; dark yellowish brown (10YR 4/4) very cobbly sandy loam; weak medium subangular blocky structure; friable; common fine and few medium roots; 45 percent sandstone

cobbles, gravel, and stones as much as 20 inches across; strongly acid; gradual smooth boundary.

C1—21 to 34 inches; dark yellowish brown (10YR 4/4) extremely cobbly loamy sand; single grain; loose; few fine roots; 70 percent sandstone cobbles, gravel, and stones as much as 20 inches across; strongly acid; gradual smooth boundary.

C2—34 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly loamy sand; single grain; loose; 70 percent sandstone cobbles, gravel, and stones as much as 20 inches across; strongly acid.

**Range in Characteristics***Thickness of the solum:* 20 to 40 inches*Depth to bedrock:* More than 60 inches*Size and kind of rock fragments:* Gravel, cobbles, and stones of sandstone*Reaction:* Very strongly acid or strongly acid, except in limed areas*A horizon:*

Hue—10YR

Value—3 or 4

Chroma—2 to 4

Texture of the fine-earth fraction—fine sandy loam

Content of rock fragments—15 to 35 percent

*AB horizon:*

Hue—10YR

Value—3 to 5

Chroma—2 to 6

Texture of the fine-earth fraction—fine sandy loam, sandy loam, or loam

Content of rock fragments—15 to 35 percent

*Bw horizon:*

Hue—10YR

Value—4 or 5

Chroma—4 to 6

Texture of the fine-earth fraction—sandy loam or loam

Content of rock fragments—35 to 70 percent

*C horizon:*

Hue—10YR

Value—4 or 5

Chroma—3 to 6

Texture of the fine-earth fraction—loamy sand or sandy loam

Content of rock fragments—35 to 70 percent

**Cranmore Series***Depth class:* Very deep*Drainage class:* Poorly drained*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains and depressions

*Parent material:* Mixed alluvium from soils that formed in limestone, shale, and sandstone

*Slope range:* 0 to 2 percent

*Associated soils:* Shady and Hamblen soils on adjacent flood plains

*Taxonomic class:* Coarse-loamy, mixed, semiactive, nonacid, thermic Fluvaquentic Endoaquepts

### Typical Pedon

Cranmore loam, 0 to 2 percent slopes, frequently flooded; in Rhea County, Tennessee; about 1.8 miles northwest of Dayton on State Route 30, about 0.5 mile southwest on State Route 303 (Cranmore Cove Road), 200 feet north of State Route 303, about 100 feet north of Sale Creek; USGS Morgan Springs Quadrangle:

Ap—0 to 5 inches; dark grayish brown (2.5Y 4/2) loam; weak fine and medium granular structure; very friable; many fine and medium and few coarse roots; common fine and medium prominent yellowish red (5YR 4/6) irregular iron masses in the matrix; 1 percent gravel-sized coal fragments; strongly acid; clear smooth boundary.

Bg1—5 to 11 inches; dark grayish brown (2.5Y 4/2) loam; moderate fine and medium subangular blocky structure; friable; common fine and medium roots; many medium prominent black (5YR 2.5/1) manganese masses in the matrix; few fine prominent yellowish brown (10YR 5/6) iron masses in the matrix; 2 percent rounded sandstone gravel; slightly acid; clear smooth boundary.

Bg2—11 to 24 inches; gray (10YR 5/1) loam; weak medium subangular blocky structure; friable; few fine and medium prominent black (5YR 2.5/1) manganese masses in the matrix; few fine and medium prominent yellowish red (5YR 4/6) iron masses in the matrix; 2 percent rounded sandstone gravel; slightly acid; clear smooth boundary.

Cg1—24 to 40 inches; gray (10YR 5/1) loam; massive; friable; 1 percent rounded sandstone gravel; slightly acid; gradual smooth boundary.

Cg2—40 to 55 inches; olive gray (5Y 4/2) loam; massive; very friable; 1 percent rounded sandstone gravel; moderately acid; clear smooth boundary.

Cg3—55 to 62 inches; olive gray (5Y 4/2) and dark greenish gray (10Y 4/1) loam; massive; very

friable; 1 percent rounded sandstone gravel; moderately acid.

### Range in Characteristics

*Thickness of the solum:* 14 to 40 inches

*Depth to bedrock:* More than 60 inches

*Depth to reduced matrix:* Less than 12 inches

*Size and kind of rock fragments:* Mostly rounded or subrounded gravel of sandstone and chert with some shale, siltstone, and coal

*Reaction:* Strongly acid to neutral in the A horizon; moderately acid to slightly alkaline in the B and C horizons

#### Ap horizon:

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 5 percent

#### Bg horizon:

Hue—10YR to 5Y or neutral

Value—4 to 6

Chroma—0 to 2

Redoximorphic fractures—manganese and iron masses, concretions, and nodules in shades of yellow, brown, red, or black; a reduced matrix in shades of gray, olive, or brown

Texture of the fine-earth fraction—silty clay loam, silt loam, sandy clay loam, clay loam, loam, or sandy loam

Content of rock fragments—0 to 30 percent

#### Cg horizon:

Hue—10YR to 5Y or neutral

Value—4 to 7

Chroma—0 to 2

Redoximorphic features—manganese and iron masses, concretions, and nodules in shades of yellow, brown, red, or black; reduced matrix in shades of gray, olive, or brown

Texture of the fine-earth fraction—silty clay loam, silt loam, sandy clay loam, clay loam, loam, or sandy loam

Content of rock fragments—0 to 40 percent

### Dewey Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridges and side slopes

*Parent material:* Old alluvium underlain by residuum from limestone or dolomite

*Slope range:* 2 to 25 percent

*Associated soils:* Fullerton, Collegedale, Talbott, and Waynesboro soils

*Taxonomic class:* Fine, kaolinitic, thermic Typic Paleudults

### Typical Pedon

Dewey silt loam, 2 to 5 percent slopes; in McMinn County, Tennessee; about 1.4 miles south of Niota on U.S. Highway 11, about 875 feet west of U.S. Highway 11, in pasture; USGS Niota Quadrangle:

Ap—0 to 9 inches; dark reddish brown (5YR 3/4) silt loam; weak medium and coarse granular structure; very friable; many fine roots; 2 percent subrounded chert gravel; slightly acid; abrupt smooth boundary.

Bt1—9 to 22 inches; red (2.5YR 4/6) clay; common medium distinct dark reddish brown (5YR 3/4) mottles; moderate medium and coarse subangular blocky structure; friable; common very fine and fine roots; common fine pores; common distinct clay films on faces of peds and lining pores; 5 percent subrounded sandstone gravel; slightly acid; clear smooth boundary.

2Bt2—22 to 35 inches; red (2.5YR 4/8) clay; strong medium and coarse subangular blocky structure; friable; common very fine roots; common very fine pores; common prominent clay films on faces of peds and lining pores; 2 percent subrounded chert gravel; moderately acid; clear smooth boundary.

2Bt3—35 to 43 inches; red (2.5YR 5/6) clay; common medium faint strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; friable; common very fine roots; common very fine pores; common prominent clay films on faces of peds and lining pores; 2 percent angular chert gravel; very strongly acid; clear smooth boundary.

2Bt4—43 to 61 inches; yellowish red (5YR 5/6) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium and coarse angular blocky structure; friable; few very fine roots; common very fine pores; common prominent clay films on faces of peds and lining pores; 2 percent angular chert gravel; very strongly acid; clear smooth boundary.

2Bt5—61 to 72 inches; yellowish red (5YR 5/6) clay; many medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium and coarse angular blocky structure; friable; common very fine pores; common prominent clay films on faces of peds

and lining pores; 5 percent angular chert gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel of chert and sandstone

*Reaction:* Very strongly acid to moderately acid, except in limed areas

*Ap horizon:*

Hue—5YR or 7.5YR

Value—3 to 5

Chroma—3 to 6

Texture—silt loam

Content of rock fragments—0 to 5 percent

*Bt horizon:*

Hue—2.5YR or 5YR

Value—3 to 5

Chroma—6 to 8

Mottles—in shades of yellow, red, or brown

Texture—dominantly clay or silty clay; in some pedons the horizon is silty clay loam or clay loam in the upper 5 inches

Content of rock fragments—0 to 10 percent

### Ealy Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Flood plains

*Parent material:* Alluvium

*Slope range:* 0 to 3 percent

*Associated soils:* Craigsville soils in the same landform positions as the Ealy soils; Jefferson, Varilla, and Shelocta soils on adjacent footslopes and alluvial fans

*Taxonomic class:* Coarse-loamy, siliceous, semiactive, mesic Fluventic Dystrudepts

### Typical Pedon

Ealy fine sandy loam in an area of Ealy-Craigsville complex, occasionally flooded; in Cumberland County, Tennessee; on the flood plain of the Obed River in the Catoosa Wildlife Management Area, 100 feet northwest of Elmore Creek and the Obed River; USGS Fox Creek Quadrangle:

A—0 to 3 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable;

many fine and medium roots; strongly acid; abrupt smooth boundary.

BA—3 to 10 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium and coarse yellowish brown (10YR 5/4) mottles; weak coarse granular structure; very friable; many fine to coarse roots; strongly acid; clear smooth boundary.

Bw—10 to 39 inches; dark yellowish brown (10YR 4/6) fine sandy loam; weak coarse subangular blocky structure; very friable; common fine and medium roots; strongly acid; gradual smooth boundary.

C1—39 to 50 inches; dark yellowish brown (10YR 4/4) loam; common medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; strongly acid; gradual smooth boundary.

C2—50 to 60 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; very friable; few fine and medium roots; strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 24 to 40 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### A horizon:

Hue—10YR

Value—4 or 5

Chroma—2 to 4

Texture—fine sandy loam

Content of rock fragments—0 to 15 percent

#### BA horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 or 4

Texture—fine sandy loam or loam

Content of rock fragments—0 to 15 percent

#### Bw horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 to 6

Texture—loam or fine sandy loam

Content of rock fragments—0 to 15 percent

#### C horizon:

Hue—10YR

Value—4 or 5

Chroma—2 to 4

Texture—loam or fine sandy loam

Content of rock fragments—0 to 15 percent

## Egam Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low stream terraces

*Parent material:* Mixed alluvium

*Slope range:* 0 to 3 percent

*Associated soils:* Staser soils on adjacent natural levees; Wolftever soils on landform positions similar to those of the Egam soils

*Taxonomic class:* Fine, mixed, active, thermic Cumulic Hapludolls

#### Typical Pedon

Egam silty clay loam, 0 to 3 percent slopes; in Rhea County, Tennessee; about 3.8 miles east of Dayton on State Road 30, about 3.6 miles east on Cottonport Road, 0.8 mile south on Maple Spring Road, 750 feet east of Maple Spring Road, about 500 feet north of the Tennessee River (Chickamauga Lake); USGS Big Spring Quadrangle:

Ap—0 to 8 inches; dark brown (10YR 3/3) silty clay loam; moderate medium granular structure; friable; common fine roots; common fine flakes of mica; slightly acid; abrupt smooth boundary.

A—8 to 24 inches; very dark grayish brown (10YR 3/2) silty clay loam; strong medium granular structure; firm; few fine roots; common fine flakes of mica; slightly acid; clear smooth boundary.

Bw1—24 to 35 inches; dark yellowish brown (10YR 4/4) silty clay; moderate medium subangular blocky structure; firm; few fine prominent black (10YR 2/1) manganese masses in the matrix; common fine distinct strong brown (7.5YR 5/6) iron masses in the matrix and on faces of peds; common fine flakes of mica; neutral; clear smooth boundary.

Bw2—35 to 49 inches; brown (10YR 4/3) clay; moderate medium subangular blocky structure; firm; few fine prominent black (10YR 2/1) manganese masses in the matrix; common fine faint brown (10YR 5/3) iron depletions in the matrix; common fine flakes of mica; neutral; clear wavy boundary.

C1—49 to 63 inches; dark yellowish brown (10YR 4/6) clay; massive; firm; common fine prominent black (10YR 2/1) manganese masses in the matrix;

common medium distinct strong brown (7.5YR 5/6) iron masses in the matrix; common medium prominent gray (10YR 5/1) iron depletions in the matrix; common fine flakes of mica; neutral; clear wavy boundary.

C2—63 to 72 inches; dark yellowish brown (10YR 4/4) clay; massive; firm; few fine prominent black (10YR 2/1) manganese masses in the matrix; common fine distinct strong brown (7.5YR 5/6) iron masses in the matrix; common medium prominent gray (10YR 6/1) iron depletions in the matrix; common fine flakes of mica; neutral.

### Range in Characteristics

*Thickness of the solum:* 40 to 60 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel of sandstone, quartzite, and chert

*Reaction:* Moderately acid to neutral

*Ap and A horizons:*

Hue—10YR

Value—2 or 3

Chroma—2 or 3

Texture—silty clay loam

Content of rock fragments—0 to 5 percent

*Bw horizon:*

Hue—7.5YR to 2.5Y

Value—4 or 5

Chroma—3 to 6

Redoximorphic features—manganese and iron concretions and masses in shades of yellow, red, black, or brown; iron depletions in shades of brown or gray; iron depletions with chroma of 2 or less occur below a depth of 40 inches

Texture—silty clay or clay

Content of rock fragments—0 to 5 percent

*C horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 6

Chroma—1 to 6

Redoximorphic features—manganese and iron concretions and masses in shades of yellow, red, black, or brown; iron depletions in shades of brown or gray

Texture—silty clay loam, silty clay, or clay

Content of rock fragments—0 to 5 percent

## Etowah Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Stream terraces, alluvial fans, and footslopes

*Parent material:* Alluvium or colluvium

*Slope range:* 2 to 12 percent

*Associated soils:* Waynesboro, Wolftever, and Holston soils in landform positions similar to those of the Etowah soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Typic Paleudults

### Typical Pedon

Etowah silt loam, 2 to 5 percent slopes; in Meigs County, Tennessee; about 14.0 miles south of Decatur on State Road 58, about 1.7 miles east on Brittville Road, about 100 yards west of the bridge over Flag Pond on Chickamauga Lake (Hiwassee River), in a hay field; USGS Birchwood Quadrangle:

Ap—0 to 7 inches; dark brown (7.5YR 3/2) silt loam; moderate fine granular structure; very friable; common fine roots; moderately acid; clear smooth boundary.

Bt1—7 to 13 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; few faint clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—13 to 24 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; many faint clay films on faces of peds; 2 percent rounded chert gravel; strongly acid; clear smooth boundary.

Bt3—24 to 38 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine pores; many faint clay films on faces of peds; 2 percent rounded chert gravel; strongly acid; gradual smooth boundary.

Bt4—38 to 54 inches; strong brown (7.5YR 5/6) silty clay loam; common fine and medium distinct red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; firm; few fine roots; few fine pores; many faint clay films on faces of peds; 2 percent rounded chert gravel; strongly acid; gradual wavy boundary.

Bt5—54 to 70 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct red (2.5YR 4/6) and few fine distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; 2 percent rounded chert gravel as much as 3 inches across; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel and pebbles of sandstone and chert

*Reaction:* Very strongly or strongly acid, except in limed areas

#### *Ap horizon:*

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—2 to 4

Texture—silt loam

Content of rock fragments—0 to 15 percent

#### *Bt horizon:*

Hue—2.5YR to 7.5YR

Value—4 or 5

Chroma—6 to 8

Mottles—in shades of yellow, red, gray, or brown

Texture—dominantly silty clay loam, silt loam, loam, or clay loam; range includes silty clay or clay below a depth of 40 inches

Content of rock fragments—0 to 15 percent

## Fullerton Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridge crests, shoulder slopes, and side slopes

*Parent material:* Residuum from cherty limestone or dolomite; some pedons have 1 to 2 feet of colluvium overlying residuum

*Slope range:* 2 to 60 percent

*Associated soils:* Dewey and Pailo soils in landform positions similar to those of the Fullerton soils; Minvale and Tasso soils on footslopes

*Taxonomic class:* Fine, kaolinitic, thermic Typic Paleudults

### Typical Pedon

Fullerton gravelly silt loam, 12 to 25 percent slopes; in Rhea County, Tennessee; about 7.6 miles north of Spring City on U.S. Highway 27, about 800 feet east of U.S. Highway 27 on a west-facing side slope between Camp Creek and Watts Bar Lake; USGS Roddy Quadrangle:

A—0 to 7 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; moderate medium granular

structure; very friable; many fine and medium roots; 15 percent chert gravel; slightly acid; clear smooth boundary.

BE—7 to 15 inches; brownish yellow (10YR 6/6) very gravelly loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 40 percent chert gravel; strongly acid; clear smooth boundary.

Bt1—15 to 30 inches; yellowish red (5YR 5/8) gravelly clay; weak medium subangular blocky structure; friable; few fine and medium roots; few faint clay films on faces of peds and lining pores; 25 percent chert gravel; very strongly acid; clear smooth boundary.

Bt2—30 to 49 inches; red (2.5YR 5/8) gravelly clay; few medium prominent brownish yellow (10YR 6/6) mottles; strong medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds and lining pores; 15 percent chert gravel; very strongly acid; clear smooth boundary.

Bt3—49 to 65 inches; red (2.5YR 5/8) gravelly clay; common medium prominent brownish yellow (10YR 6/6) mottles; moderate fine and medium subangular blocky structure; friable; very few fine roots; many prominent clay films on faces of peds and lining pores; 20 percent chert gravel; very strongly acid; clear smooth boundary.

Bt4—65 to 72 inches; red (2.5YR 5/8) very gravelly clay; common medium prominent brownish yellow (10YR 6/6) mottles; moderate fine angular blocky structure; firm; many prominent clay films on faces of peds and lining pores; 40 percent chert gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *A horizon:*

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—3 or 4

Texture of the fine-earth fraction—silt loam

Content of rock fragments—10 to 45 percent

#### *BE horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 6

Texture of the fine-earth fraction—silt loam or loam

Content of rock fragments—10 to 45 percent

*Bt horizon:*

Hue—2.5YR or 5YR; 7.5YR only in the upper part

Value—4 to 6

Chroma—4 to 8

Mottles—in shades of yellow, red, or brown

Texture of the fine-earth fraction—clay or clay loam

Content of rock fragments—commonly 15 to 40 percent; content ranges to 60 percent in the lower part of horizon

## ***Gilpin Series***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Ridge crests, shoulder slopes, and side slopes

*Parent material:* Residuum from shale and mudstone

*Slope range:* 5 to 60 percent

*Associated soils:* Sequoia and Bouldin soils on side slopes; Lily and Lonewood soils on ridge crests

*Taxonomic class:* Fine-loamy, mixed, active, mesic Typic Hapludults

### **Typical Pedon**

Gilpin loam, 12 to 20 percent slopes; in Cumberland County, Tennessee; 0.5 mile northeast of the intersection of Millstone Mountain Road and Mount Vernon Road, 100 feet north of the road, in an area of woodland; USGS Ozone Quadrangle:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 1 inch; dark grayish brown (10YR 4/2) loam; weak medium granular structure; very friable; many very fine and fine roots; 10 percent sandstone gravel; strongly acid; abrupt smooth boundary.

BE—1 to 5 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable; common very fine and fine roots; 10 percent sandstone gravel; strongly acid; gradual smooth boundary.

Bt1—5 to 21 inches; yellowish brown (10YR 5/6) channery silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 15 percent shale channers; strongly acid; gradual smooth boundary.

Bt2—21 to 34 inches; yellowish brown (10YR 5/6) channery silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; friable; few fine and medium roots; common distinct clay films on faces of peds; 20 percent shale channers; strongly acid; gradual smooth boundary.

C—34 to 38 inches; yellowish brown (10YR 5/6) channery clay; common medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; 30 percent shale channers; strongly acid; gradual smooth boundary.

Cr—38 to 50 inches; soft shale bedrock.

### **Range in Characteristics**

*Thickness of the solum:* 20 to 36 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and channers of shale, sandstone, and mudstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*A horizon:*

Hue—10YR

Value—3 or 4

Chroma—2 or 3

Texture of the fine-earth fraction—loam

Content of rock fragments—5 to 20 percent

*BE horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 5

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—5 to 20 percent

*Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture of the fine-earth fraction—silt loam, loam, clay loam, or silty clay loam

Content of rock fragments—5 to 40 percent

*C horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 6

Mottles—in shades of red or brown

Texture of the fine-earth fraction—clay, clay loam, or silty clay loam

Content of rock fragments—5 to 40 percent

*Cr horizon:*

Texture—weathered, soft multicolored shale or mudstone

## Hamblen Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains and drainageways

*Parent material:* Alluvium

*Slope range:* 0 to 3 percent

*Associated soils:* Etowah, Holston, and Shady soils on adjacent stream terraces; Minvale soils on footslopes; Fullerton, Dewey, and Waynesboro soils on ridges and high terraces

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Fluvaquent Eutrudepts

### Typical Pedon

Hamblen silt loam, occasionally flooded; in Roane County, Tennessee; 800 feet southeast of Post Oak Church on Black Jack Road, 250 feet northeast of Black Jack Road, 2.6 miles (airline) southeast of Rockwood; USGS Rockwood Quadrangle:

Ap—0 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium granular structure; very friable; many fine roots; many fine tubular pores; neutral; clear smooth boundary.

Bw1—5 to 22 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky and moderate medium granular structure; very friable; common fine roots; many fine and medium tubular pores; slightly acid; gradual smooth boundary.

Bw2—22 to 43 inches; yellowish brown (10YR 5/6) fine sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; few fine faint yellowish red (5YR 5/6) iron masses on faces of peds; common medium prominent light brownish gray (10YR 6/2) iron depletions in the matrix; moderately acid; clear smooth boundary.

C—43 to 62 inches; light yellowish brown (10YR 6/4) sandy loam; massive; very friable; many medium prominent yellowish red (5YR 5/6) irregular iron masses in the matrix; many coarse distinct light brownish gray (10YR 6/2) irregular iron depletions in the matrix; slightly acid.

### Range in Characteristics

*Thickness of the solum:* 20 to 55 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Subrounded and rounded gravel of chert, limestone, and shale

*Reaction:* Strongly acid to neutral

*Ap horizon:*

Hue—10YR

Value—4 or 5

Chroma—2 to 4

Texture—silt loam

Content of rock fragments—0 to 10 percent

*Bw horizon:*

Hue—7.5YR to 2.5Y

Value—4 or 5

Chroma—3 to 6

Redoximorphic features—iron and manganese masses and concretions in shades of brown or yellow; iron depletions in shades of gray occur within a depth of 24 inches

Texture—silt loam, loam, clay loam, silty clay loam, or fine sandy loam

Content of rock fragments—0 to 10 percent

*C horizon:*

Hue—7.5YR to 5Y or neutral

Value—4 to 6

Chroma—1 to 6

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, or red; iron depletions in shades of gray

Texture—silt loam, loam, clay loam, silty clay loam, sandy loam, or fine sandy loam

Content of rock fragments—0 to 35 percent

## Hendon Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate and moderately slow

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Broad ridge crests

*Parent material:* Loamy mantle over sandstone, siltstone, or shale residuum

*Slope range:* 2 to 5 percent

*Associated soils:* Lily, Ramsey, and Lonewood soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, mesic Fragic Paleudults

### Typical Pedon

Hendon silt loam, 2 to 6 percent slopes; in Bledsoe County, Tennessee; 100 feet north of Brayton Mountain Road on a wide ridgetop between the heads of Holly Creek and Cunningham Branch, northwest of Hart Spring, about 1.5 miles southeast of Brayton; USGS Brayton Quadrangle:

Oi—2 inches to 0; partially decomposed pine needles and twigs.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—1 to 10 inches; yellowish brown (10YR 5/4) silt loam; moderate medium granular structure; friable; common fine and medium roots; very fine tubular pores; very strongly acid; gradual smooth boundary.

Bt1—10 to 15 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine and medium roots; common fine and few medium tubular pores; few faint clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

Bt2—15 to 25 inches; yellowish brown (10YR 5/8) silt loam; weak medium subangular blocky structure; friable; few fine roots; common fine and few medium tubular pores; few faint clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

2Btx/E—25 to 32 inches; yellowish brown (10YR 5/6) loam; common medium prominent yellowish red (5YR 5/8) mottles (B part); few very pale brown (10YR 7/3) loam pockets and coatings on the faces of most prisms (E part); weak medium prismatic structure parting to weak thick platy and weak medium subangular blocky structure; firm; common fine tubular pores; few faint clay films on faces of peds and lining pores; few small pebbles in the upper 2 inches; 40 to 60 percent brittle material; few faint clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

2Btx—32 to 44 inches; yellowish red (5YR 5/8) loam; few medium prominent light olive brown (2.5YR 5/4) mottles; weak coarse prismatic structure parting to weak thick platy and weak medium subangular blocky; firm; few fine tubular pores; very pale brown coatings on faces of prisms; few faint clay films on faces of peds and lining pores; very pale brown (10YR 7/3) silt coats on faces of prisms; 50 to 60 percent brittle material; strongly acid; gradual smooth boundary.

2Bt—44 to 65 inches; yellowish red (5YR 5/8) loam; common medium prominent brownish yellow (10YR 6/6) and few fine faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine tubular pores; few faint clay films on faces of peds; very strongly acid.

#### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and channers of sandstone and shale

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### A horizon:

Hue—10YR

Value—3 or 4

Chroma—2

Texture—silt loam

Content of rock fragments—0 to 5 percent

#### E horizon:

Hue—10YR

Value—5 or 6

Chroma—3 or 4

Texture—silt loam or loam

Content of rock fragments—0 to 5 percent

#### Bt horizon and the upper few inches of the

##### 2Btx/E horizon:

Hue—7.5YR or 10YR

Value—5 or 6

Chroma—4 to 8

Mottles—in shades of red, yellow, or brown

Texture—silt loam, loam, or clay loam

Content of rock fragments—0 to 10 percent

#### E part of the 2Btx/E horizon:

Hue—10YR

Value—6 or 7

Chroma—1 to 3

Texture—loam or silt loam

Content of rock fragments—0 to 10 percent

#### 2Btx and 2Bt horizons:

Hue—2.5YR to 7.5YR

Value—4 or 5

Chroma—6 to 8

Mottles and redoximorphic features—mottles in shades of red, yellow, or brown; iron depletions in shades of gray occur in a few pedons below a depth of 30 inches

Texture—loam or clay loam

Content of rock fragments—0 to 10 percent

### Holston Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Stream terraces, alluvial fans, and footslopes

*Parent material:* Alluvium or colluvium

*Slope range:* 2 to 12 percent

*Associated soils:* Waynesboro, Wolftever, and Altavista soils; Etowah soils in landform positions similar to those of the Holston soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Typic Paleudults

### Typical Pedon

Holston loam, 5 to 12 percent slopes; in Rhea County, Tennessee; 3.9 miles east of Dayton on State Road 30, about 0.9 mile east on Cottonport Road, 0.3 mile south on Double S Road, 1.8 miles south on Purser Road, 0.7 mile southeast of Purser Road, about 1,000 feet northwest of the Tennessee River (Chickamauga Lake); USGS Big Spring Quadrangle:

Ap—0 to 6 inches; dark yellowish brown (10YR4/4) loam; weak medium granular structure; very friable; common fine roots; 5 percent rounded gravel; moderately acid; clear smooth boundary.

Bt1—6 to 23 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—23 to 46 inches; strong brown (7.5YR 5/8) clay loam; common medium prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; few medium prominent black (10YR 2/1) manganese masses in the matrix; strongly acid; clear smooth boundary.

Bt3—46 to 72 inches; strong brown (7.5YR 5/8) clay loam; common medium prominent light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common faint yellowish red (5YR 5/8) clay films on faces of peds; few medium prominent black (10YR 2/1) manganese masses in the matrix; few fine black (10YR 2/1) manganese concretions in the matrix; few fine flakes of mica; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel and pebbles of sandstone and chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*Ap horizon:*

Hue—10YR

Value—4 or 5

Chroma—2 to 4

Texture—loam

Content of rock fragments—0 to 15 percent

*Bt horizon:*

Hue—7.5YR in the upper part of horizon; 7.5YR or 5YR below a depth of 40 inches

Value—4 to 6

Chroma—4 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown, red, or black; iron depletions in shades of gray occur below a depth of 40 inches in some areas

Texture—loam, clay loam, or, rarely, sandy clay loam or silty clay loam; clay texture may occur below a depth of 40 inches

Content of rock fragments—0 to 15 percent

## Jefferson Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Side slopes and footslopes

*Parent material:* Colluvium mostly from sandstone

*Slope range:* 5 to 60 percent

*Associated soils:* Varilla and Shelcota soils in the same landform positions as the Jefferson soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

### Typical Pedon

Jefferson cobbly loam in an area of Jefferson-Varilla-Shelcota complex, 20 to 60 percent slopes, very stony; in Cumberland County, Tennessee; 400 feet north of the Obed River on Genesis Road, 100 feet west of the road; USGS Fox Creek Quadrangle:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) cobbly loam; weak fine granular structure; very friable; common fine and medium roots; 20 percent gravel and cobbles as much as 8 inches in diameter; strongly acid; abrupt smooth boundary.

E—1 to 7 inches; yellowish brown (10YR 5/4) cobbly loam; weak medium granular structure; friable; common fine and medium roots; 20 percent gravel and cobbles as much as 8 inches in diameter; strongly acid; clear smooth boundary.

Bt1—7 to 17 inches; yellowish brown (10YR 5/6) cobbly loam; weak medium subangular blocky structure; friable; common fine and medium roots;

few faint clay films on faces of peds; 30 percent cobbles and gravel as much as 8 inches in diameter; strongly acid; gradual smooth boundary.

Bt2—17 to 40 inches; yellowish brown (10YR 5/6) cobbly loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 30 percent cobbles and gravel as much as 8 inches in diameter; strongly acid; gradual smooth boundary.

Bt3—40 to 56 inches; yellowish brown (10YR 5/6) very cobbly clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; 40 percent cobbles and gravel as much as 8 inches in diameter; strongly acid; gradual smooth boundary.

C—56 to 60 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; common medium distinct light yellowish brown (10YR 6/4) and common medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; 50 percent gravel and cobbles as much as 5 inches in diameter; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 40 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *A horizon:*

Hue—10YR

Value—3 to 5

Chroma—1 to 3

Texture of the fine-earth fraction—loam

Content of rock fragments—5 to 35 percent

#### *E horizon:*

Hue—10YR

Value—4 to 6

Chroma—3 or 4

Texture of the fine-earth fraction—loam or sandy loam

Content of rock fragments—5 to 35 percent

#### *Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture of the fine-earth fraction—loam, sandy clay loam, or clay loam

Content of rock fragments—5 to 35 percent in the upper part of horizon; 20 to 80 percent in the lower part

#### *BC and C horizons:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Mottles—in shades of brown, yellow, or red and, in the lower part, gray

Texture of the fine-earth fraction—sandy loam, sandy clay loam, or clay loam

Content of rock fragments—20 to 80 percent

## Ketona Series

*Depth class:* Deep

*Drainage class:* Poorly drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains, drainageways, upland flats, and depressions

*Parent material:* Mixed alluvium from soils that formed in limestone and shale

*Slope range:* 0 to 2 percent

*Associated soils:* Tupelo soils in landform positions similar to those of the Ketona soils; Colbert and Capshaw soils on adjacent terraces and uplands

*Taxonomic class:* Fine, mixed, superactive, thermic Vertic Epiaqualfs

### Typical Pedon

Ketona silty clay loam in an area of Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded; in Rhea County, Tennessee; about 3.3 miles east of Dayton on State Road 30, about 2.2 miles south on New Union Road, 1.4 miles southeast on New Bethel Road, 1.1 miles northeast on a private road, 1,750 feet west of the private road, adjacent to a drainageway; USGS Big Spring Quadrangle:

Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam; moderate medium granular structure; very friable; common fine roots; few fine and medium prominent black (10YR 2/1) manganese concretions in the matrix; strongly acid; clear smooth boundary.

Btg1—6 to 15 inches; grayish brown (10YR 5/2) clay; moderate medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; few fine and medium prominent black (10YR 2/1) manganese concretions in the matrix; common medium prominent yellowish brown (10YR 5/8) irregular iron masses in the matrix; moderately acid; clear smooth boundary.

Btg2—15 to 26 inches; grayish brown (2.5Y 5/2) clay; moderate medium angular blocky structure; firm;

very few fine roots; few faint clay films on faces of peds; common distinct pressure faces; common fine prominent black (10YR 2/1) manganese masses in the matrix; common medium prominent yellowish brown (10YR 5/8) iron masses in the matrix; common fine prominent gray (N 5/0) iron depletions in the matrix; moderately acid; clear smooth boundary.

Btg3—26 to 36 inches; grayish brown (2.5Y 5/2) clay; moderate coarse angular blocky structure; very firm; few very fine roots; few distinct clay films on faces of peds; common distinct pressure faces; common fine prominent black (10YR 2/1) manganese masses in the matrix; common medium prominent yellowish brown (10YR 5/6) iron masses in the matrix; common medium faint gray (2.5Y 6/1) iron depletions in the matrix; 2 percent chert and limestone gravel; neutral; clear smooth boundary.

C—36 to 48 inches; light olive brown (2.5Y 5/4) clay; massive; very firm; very few fine roots; common distinct pressure faces; common coarse prominent gray (N 5/0) iron depletions in the matrix; 2 percent chert and limestone gravel; neutral; abrupt smooth boundary.

R—48 to 52 inches; hard limestone.

#### Range in Characteristics

*Thickness of the solum:* 30 to more than 60 inches

*Depth to bedrock:* 40 to 60 inches

*Size and kind of rock fragments:* Mostly rounded or subrounded gravel of limestone and chert

*Reaction:* Moderately acid to slightly alkaline

#### *Ap horizon:*

Hue—10YR

Value—2 to 4

Chroma—1 to 3

Texture—silty clay loam

Content of rock fragments—0 to 5 percent

#### *Btg horizon:*

Hue—10YR, 2.5Y, or neutral

Value—4 to 6

Chroma—0 to 2

Redoximorphic features—manganese and iron masses and concretions in shades of yellow, brown, red, or black; iron depletions in shades of brown or gray

Texture—clay or silty clay

Content of rock fragments—0 to 5 percent

#### *C horizon:*

Hue—10YR, 2.5Y, or neutral

Value—4 to 7

Chroma—0 to 4

Redoximorphic features—manganese and iron masses and concretions in shades of yellow, brown, red, or black; iron depletions in shades of brown or gray; a reduced matrix occurs in some pedons

Texture—clay or silty clay

Content of rock fragments—0 to 10 percent

## Lily Series

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Ridge crests and side slopes

*Parent material:* Residuum from sandstone

*Slope range:* 5 to 35 percent

*Associated soils:* Hendon, Ramsey, and Lonewood soils in landform positions similar to those of the Lily soils

*Taxonomic class:* Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

#### Typical Pedon

Lily loam, 2 to 5 percent slopes; in Cumberland County, Tennessee; 0.2 mile southeast of Old Neal Chapel Church on Potato Farm Road, 100 feet east of the road; USGS Fox Creek Quadrangle:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 2 inches; brown (10YR 4/3) loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

BE—2 to 6 inches; yellowish brown (10YR 5/4) loam; moderate medium granular structure; friable; many fine to coarse roots; very strongly acid; gradual smooth boundary.

Bt1—6 to 22 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine to coarse roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—22 to 31 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of peds; very strongly acid; gradual smooth boundary.

C—31 to 35 inches; brownish yellow (10YR 6/8) cobbly sandy loam; massive; 30 percent channers and cobbles as much as 6 inches in length; very strongly acid; clear smooth boundary.

R—35 inches; hard sandstone bedrock.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *A horizon:*

Hue—10YR

Value—4 to 6

Chroma—2 to 4

Texture of the fine-earth fraction—loam

Content of rock fragments—0 to 30 percent

#### *BE horizon:*

Hue—10YR

Value—4 to 6

Chroma—2 to 4

Texture of the fine-earth fraction—loam or sandy loam

Content of rock fragments—0 to 30 percent

#### *Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture of the fine-earth fraction—loam, sandy clay loam, or clay loam

Content of rock fragments—0 to 30 percent

#### *C horizon:*

Hue—5YR to 10YR

Value—4 to 6

Chroma—4 to 8

Texture of the fine-earth fraction—loamy sand, sandy loam, loam, or sandy clay loam

Content of rock fragments—0 to 35 percent

#### *R horizon:*

Texture—hard sandstone bedrock

## Lonewood Series

*Depth class:* Deep and very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Smooth ridgetops

*Parent material:* A mantle of loamy material underlain by residuum from sandstone

*Slope range:* 2 to 12 percent

*Associated soils:* Hendon soils in the same landform positions as the Lonewood soils; Lily soils on

adjacent ridgetops and side slopes; Ramsey soils on adjacent shoulder slopes and side slopes

*Taxonomic class:* Fine-loamy, siliceous, semiactive, mesic Typic Hapludults

### Typical Pedon

Lonewood fine sandy loam in an area of Lonewood-Hendon complex, 5 to 12 percent slopes; in Rhea County, Tennessee; about 1.2 miles north of Spring City on State Route 68, about 5.0 miles northwest on Shut-in Gap Road, 300 feet south of Shut-in Gap Road; USGS Pennine Quadrangle:

Oi—1 inch to 0; partially decomposed pine needles and twigs.

Ap—0 to 6 inches; brown (10YR 4/3) fine sandy loam; common coarse distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; very friable; common fine and medium roots; common fine and medium tubular pores; slightly acid; clear wavy boundary.

Bt1—6 to 16 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine and medium tubular pores; few patchy distinct clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

Bt2—16 to 24 inches; yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; friable; few fine roots; few very fine tubular pores; few distinct clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

Bt3—24 to 35 inches; strong brown (7.5YR 5/8) clay loam; common fine prominent light yellowish brown (10YR 6/4) lithochromic mottles; weak medium subangular blocky structure; friable; very few fine roots; few very fine tubular pores; few distinct clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

2Bt4—35 to 44 inches; yellowish red (5YR 5/8) clay loam; common fine prominent light yellowish brown (10YR 6/4) mottles; weak fine subangular blocky structure; friable; very few very fine roots; few very fine tubular pores; common distinct clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

2BC—44 to 54 inches; yellowish red (5YR 5/8) clay loam; common fine prominent brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; very few fine roots; very few very fine tubular pores; few distinct clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

2CB—54 to 60 inches; strong brown (7.5YR 5/8) clay

loam; few medium distinct yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; friable; strongly acid; clear smooth boundary.  
 2C—60 to 64 inches; strong brown (7.5YR 5/8) sandy clay loam; common fine distinct yellowish red (5YR 5/6) mottles; massive; friable; 2 percent sandstone gravel; strongly acid.

#### Range in Characteristics

*Thickness of the solum:* 40 to 65 inches  
*Depth to bedrock:* 40 to 72 inches or more  
*Size and kind of rock fragments:* Gravel and channers of sandstone  
*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### Ap horizon:

Hue—10YR  
 Value—3 to 5  
 Chroma—2 to 4  
 Texture—fine sandy loam  
 Content of rock fragments—0 to 5 percent

#### Bt horizon:

Hue—7.5YR or 10YR  
 Value—5  
 Chroma—4 to 8  
 Mottles—few to many in shades of brown, yellow, or red  
 Texture—clay loam or loam  
 Content of rock fragments—0 to 10 percent

#### 2Bt horizon:

Hue—2.5YR to 7.5YR  
 Value—4 or 5  
 Chroma—6 to 8  
 Mottles—few or common in shades of brown, yellow, or red  
 Texture—loam, clay loam, sandy clay loam, or clay  
 Content of rock fragments—0 to 10 percent

#### 2BC and 2CB horizons:

Hue—2.5YR to 7.5YR  
 Value—4 or 5  
 Chroma—6 to 8  
 Mottles—few to many in shades of brown, yellow, or red  
 Texture of the fine-earth fraction—loam, sandy loam, sandy clay loam, or clay loam  
 Content of rock fragments—0 to 40 percent

#### 2C horizon:

Hue—2.5YR to 10YR  
 Value—4 to 6  
 Chroma—4 to 8

Mottles—few to many in shades of brown, yellow, red, or gray  
 Texture of the fine-earth fraction—sandy loam, loam, sandy clay loam, or clay loam  
 Content of rock fragments—0 to 50 percent

### Lyerly Series

*Depth class:* Moderately deep  
*Drainage class:* Moderately well drained  
*Permeability:* Very slow  
*Physiographic area:* Southern Appalachian Ridges and Valleys  
*Position on the landform:* Low ridges and upland flats  
*Parent material:* Residuum from interbedded argillaceous limestone and calcareous shale  
*Slope range:* 2 to 12 percent  
*Associated soils:* Capshaw, Colbert, and Conasauga soils and areas of limestone rock outcrop  
*Taxonomic class:* Very fine, mixed, active, thermic Oxyaquic Vertic Hapludalfs

#### Typical Pedon

Lyerly silty clay loam in an area of Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky; in Rhea County, Tennessee; about 4.8 miles south of Spring City on U.S. Highway 27, about 1,000 feet west of U.S. Highway 27, about 0.5 mile southwest of Pennine; USGS Pennine Quadrangle:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—4 to 11 inches; yellowish brown (10YR 5/6) clay; moderate medium angular blocky structure; firm, sticky, plastic; common fine roots; few distinct pressure faces; common distinct clay films on faces of peds; many medium distinct dark yellowish brown (10YR 4/4) iron and manganese masses in the matrix; slightly alkaline; abrupt smooth boundary.

Bt2—11 to 22 inches; yellowish brown (10YR 5/8) clay; moderate medium angular blocky structure; firm, very sticky, very plastic; few fine roots; few distinct pressure faces; many distinct clay films on faces of peds; few fine and medium prominent black (10YR 2/1) spherical weakly cemented manganese nodules in the matrix; many fine prominent light yellowish brown (2.5Y 6/4) iron masses in the matrix; slightly alkaline; gradual smooth boundary.

Bt3—22 to 28 inches; yellowish brown (10YR 5/6)

clay; weak medium angular and subangular blocky structure; very firm, very sticky, very plastic; very few fine roots; common distinct pressure faces; common faint clay films on faces of peds; few fine prominent black (10YR 2/1) weakly cemented manganese nodules in the matrix; many medium distinct light yellowish brown (2.5Y 6/4) iron masses in the matrix; many medium prominent light brownish gray (2.5Y 6/2) iron depletions in the matrix; 2 percent limestone and chert gravel; slightly alkaline; abrupt smooth boundary.

R—28 to 32 inches; hard limestone bedrock.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and flagstones of limestone and chert

*Nodules, concretions, and masses of iron and manganese:* None to common throughout the profile

*Reaction:* Strongly acid to slightly acid in the A horizon and the upper part of the Bt horizon; slightly acid to slightly alkaline in the lower part of the Bt horizon

#### *Ap horizon:*

Hue—10YR or 2.5Y

Value—4 to 6

Chroma—2 to 4

Texture—silty clay loam

Content of rock fragments—0 to 15 percent

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6

Chroma—4 to 8

Redoximorphic features—manganese and iron concretions and masses in shades of red, yellow, black, or brown; iron depletions in shades of gray occur below the upper 10 inches of horizon

Texture—clay or silty clay

Content of rock fragments—0 to 15 percent

#### *R horizon:*

Texture—hard limestone

## Minvale Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Footslopes, benches, and fans

*Parent material:* Colluvium and underlying residuum from cherty limestone

*Slope range:* 2 to 25 percent

*Associated soils:* Tasso soils in the same landform positions as the Minvale soils; Fullerton, Dewey, and Pailo soils on ridge crests, shoulder slopes, and side slopes

*Taxonomic class:* Fine-loamy, siliceous, subactive, thermic Typic Paleudults

### Typical Pedon

Minvale gravelly silt loam, 5 to 12 percent slopes; in Meigs County, Tennessee; about 4.5 miles north of Decatur on State Highway 58, about 0.6 mile northeast on Herd Road, 1.5 miles north on Big Sewee Road, 100 yards west of Big Sewee Road; USGS Decatur Quadrangle:

Ap—0 to 8 inches; brown (10YR 5/3) gravelly silt loam; moderate medium granular structure; friable; many fine and medium roots; 15 percent chert gravel; strongly acid; clear smooth boundary.

BE—8 to 13 inches; strong brown (7.5YR 5/6) gravelly silt loam; moderate medium and fine subangular blocky structure; friable; common fine and medium roots; 15 percent chert gravel; strongly acid; clear smooth boundary.

Bt1—13 to 30 inches; yellowish red (5YR 4/6) gravelly silty clay loam; moderate medium subangular blocky structure; friable; common faint clay films on faces of peds; few fine roots; 15 percent chert gravel; strongly acid; gradual smooth boundary.

Bt2—30 to 60 inches; yellowish red (5YR 4/8) gravelly silty clay loam; few fine prominent pale brown (10YR 6/3) mottles in the lower 15 inches; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; 18 percent chert gravel; strongly acid; gradual smooth boundary.

Bt3—60 to 72 inches; yellowish red (5YR 4/8) gravelly silty clay loam; many fine to coarse prominent brownish yellow (10YR 6/6), light yellowish brown (10YR 6/4), and strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular and angular blocky structure; friable; few faint clay films on faces of peds; 35 percent chert gravel; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*Ap horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—2 to 4

Texture of the fine-earth fraction—silt loam

Content of rock fragments—10 to 35 percent

*BE horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—2 to 8

Texture of the fine-earth fraction—silt loam or loam

Content of rock fragments—15 to 35 percent

*Bt horizon:*

Hue—2.5YR to 10YR

Value—4 or 5

Chroma—4 to 8

Mottles—in shades of yellow, red, gray, or brown  
Texture of the fine-earth fraction—typically silty clay loam, silt loam, or clay loam; range includes silty clay or clay below a depth of 40 inches

Content of rock fragments—15 to 35 percent in the upper part of horizon; 15 to 50 percent below a depth of 40 inches

## **Pailo Series**

*Depth class:* Very deep

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridge crests and side slopes

*Parent material:* Residuum from cherty limestone and dolomite; the upper 24 inches of the profile may have formed in colluvium or soil creep

*Slope range:* 5 to 60 percent

*Associated soils:* Fullerton and Dewey soils in landform positions similar to those of the Pailo soils; Minvale and Tasso soils on footslopes

*Taxonomic class:* Loamy-skeletal, siliceous, semiactive, thermic Typic Paleudults

### **Typical Pedon**

Pailo gravelly silt loam, 5 to 12 percent slopes,

eroded; in McMinn County, Tennessee; about 5.2 miles west on State Route 305 from its intersection with U.S. Highway 11, about 0.4 mile west on County Road 195, in a loblolly pine plantation; USGS Tranquility Quadrangle:

Oi—2 inches to 0; slightly decomposed pine needles, twigs, and hardwood litter.

Oe—0 to 1 inch; partially decomposed pine needles and twigs.

A—1 to 6 inches; brown (10YR 4/3) gravelly silt loam; moderate medium granular structure; very friable; many fine, common medium, and few coarse roots; 20 percent angular chert gravel; slightly acid; clear smooth boundary.

BE—6 to 15 inches; yellowish brown (10YR 5/4) gravelly silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 20 percent angular chert gravel; slightly acid; clear smooth boundary.

Bt1—15 to 25 inches; yellowish brown (10YR 5/4) very gravelly silty clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 40 percent angular chert gravel; very strongly acid; clear wavy boundary.

Bt2—25 to 36 inches; strong brown (7.5YR 5/6) very gravelly clay loam; few fine faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; common distinct clay films on faces of peds and lining pores; 50 percent angular chert gravel; very strongly acid; abrupt smooth boundary.

Bt3—36 to 50 inches; strong brown (7.5YR 5/6) gravelly clay; common medium faint yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine and medium roots; few fine and medium faint yellowish red (5YR 5/6) clay films on faces of peds and lining pores; 25 percent angular chert gravel; very strongly acid; clear smooth boundary.

Bt4—50 to 62 inches; variegated red (2.5YR 4/8), strong brown (7.5YR 5/8), and brownish yellow (10YR 6/6) gravelly clay; weak medium angular blocky structure; firm; few fine roots; many distinct strong brown (7.5YR 5/6) clay films on faces of peds and lining pores; 25 percent angular chert gravel and subrounded cobbles; very strongly acid.

### **Range in Characteristics**

*Thickness of the solum:* More than 72 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel and cobbles of chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*A horizon:*

Hue—10YR  
Value—3 or 4  
Chroma—2 to 4  
Texture of the fine-earth fraction—silt loam  
Content of rock fragments—15 to 40 percent

*BE horizon:*

Hue—7.5YR or 10YR  
Value—4 or 5  
Chroma—4 to 6  
Mottles—in shades of red, yellow, or brown  
Texture of the fine-earth fraction—silt loam or loam  
Content of rock fragments—25 to 50 percent

*Bt horizon:*

Hue—5YR to 10YR  
Value—4 or 5  
Chroma—6 to 8  
Mottles—in shades of red, yellow, or brown  
Texture of the fine-earth fraction—loam, clay loam, silt loam, or silty clay loam; clay textures are normally below a depth of 40 inches  
Content of rock fragments—25 to 80 percent

## ***Petros Series***

*Depth class:* Shallow

*Drainage class:* Excessively drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Steep and very steep backslopes

*Parent material:* Residuum from shale and siltstone

*Slope range:* 25 to 80 percent

*Associated soils:* Bouldin soils on footslopes; Gilpin soils in landform positions similar to those of the Petros soils

*Taxonomic class:* Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts

### **Typical Pedon**

Petros channery silt loam in an area of Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony; in Morgan County, Tennessee; 100 yards north of a logging road on an east-facing side slope on Jackson Mountain west of Poplar Creek, 1.2 miles from the end of an improved road in Magazine Hollow at the confluence of Poplar Creek and Big Mountain Creek,

about 3.3 miles (airline) northwest of Oliver Springs; USGS Petros Quadrangle:

A—0 to 1 inch; dark grayish brown (10YR 4/2)

channery silt loam; weak fine granular structure; very friable; common fine, medium, and coarse roots; 30 percent shale channers as much as 1/2 inch across; strongly acid; abrupt smooth boundary.

Bw—1 to 16 inches; yellowish brown (10YR 5/6)

extremely channery silt loam; weak fine subangular blocky structure; friable; common fine, medium, and coarse roots; 65 percent shale channers as much as 2 inches across; strongly acid; gradual smooth boundary.

Cr—16 inches; rippable shale.

### **Range in Characteristics**

*Thickness of the solum:* 10 to 20 inches

*Depth to bedrock:* 10 to 20 inches

*Size and kind of rock fragments:* Gravel and channers of siltstone and shale

*Reaction:* Very strongly acid or strongly acid

*A horizon:*

Hue—10YR  
Value—3 or 4  
Chroma—1 to 3  
Texture of the fine-earth fraction—silt loam  
Content of rock fragments—15 to 35 percent

*Bw horizon:*

Hue—7.5YR or 10YR  
Value—4 to 6  
Chroma—4 to 6  
Texture of the fine-earth fraction—silt loam or silty clay loam  
Content of rock fragments—35 to 80 percent

*Cr horizon:*

Texture—rippable siltstone and shale

## ***Philo Series***

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderate and moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Flood plains

*Parent material:* Alluvium weathered from sandstone, shale, and siltstone

*Slope range:* 0 to 3 percent

*Associated soils:* Allegheny and Cotaco soils on adjacent stream terraces; Pope and Atkins soils in

landform positions similar to those of the Philo soils

*Taxonomic class:* Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

### Typical Pedon

Philo loam in an area of Pope and Philo loams, frequently flooded; in Morgan County, Tennessee; on the flood plain of the Emory River, 600 feet northeast of the confluence of Maden Branch and the Emory River, 1,500 feet south of a bridge on Gobey Road over Maden Branch, about 0.5 mile northeast of Elizabeth; USGS Gobey Quadrangle:

Ap—0 to 6 inches; brown (10YR 4/3) loam; moderate fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

Bw1—6 to 27 inches; dark yellowish brown (10YR 4/4) loam; weak fine subangular blocky structure; friable; common fine and medium roots; strongly acid; gradual wavy boundary.

Bw2—27 to 36 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few fine and medium roots; few medium distinct strong brown (7.5YR 5/6) iron masses in the matrix; few fine distinct light brownish gray (10YR 6/2) irregular iron depletions on faces of pedis; 5 percent rounded and subrounded gravel; very strongly acid; gradual wavy boundary.

C—36 to 48 inches; yellowish brown (10YR 5/4) sandy loam; massive; very friable; few medium distinct strong brown (7.5YR 5/6) iron masses in the matrix; few fine distinct light brownish gray (10YR 6/2) irregular iron depletions on faces of pedis; 10 percent rounded and subrounded gravel; very strongly acid; clear smooth boundary.

Cg—48 to 60 inches; gray (10YR 5/1) gravelly sandy loam; massive; very friable; common medium prominent yellowish red (5YR 5/6) iron masses in the matrix; 30 percent rounded and subrounded gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 20 to 48 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and pebbles of sandstone, shale, and siltstone

*Reaction:* Very strongly acid to moderately acid, except in limed areas

*Ap horizon:*

Hue—10YR

Value—3 or 4

Chroma—2 or 3

Texture—loam

Content of rock fragments—0 to 15 percent

*Bw horizon:*

Hue—7.5YR or 10YR

Value—3 to 6

Chroma—3 to 6

Redoximorphic features—iron masses in shades of red or brown; iron depletions in shades of gray within a depth of 24 inches

Texture of the fine-earth fraction—loam, silt loam, fine sandy loam, or sandy loam

Content of rock fragments—0 to 20 percent

*C horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 6

Redoximorphic features—iron masses in shades of yellow, red, or brown; iron depletions in shades of gray

Texture of the fine-earth fraction—silt loam, loam, fine sandy loam, or sandy loam

Content of rock fragments—0 to 40 percent

*Cg horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—0 to 2

Redoximorphic features—iron masses in shades of yellow, red, or brown; a reduced matrix in shades of gray

Texture of the fine-earth fraction—silt loam, loam, or sandy clay loam

Content of rock fragments—0 to 40 percent

## Pope Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate and moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Flood plains

*Parent material:* Alluvium weathered from sandstone, shale, and siltstone

*Slope range:* 0 to 3 percent

*Associated soils:* Allegheny and Cotaco soils on adjacent stream terraces; Philo and Atkins soils in landform positions similar to those of the Pope soils

*Taxonomic class:* Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts

### Typical Pedon

Pope loam in an area of Pope and Philo loams, frequently flooded; in Morgan County, Tennessee; on the flood plain of the Emory River, 1,000 feet northeast of the confluence of Maden Branch and the Emory River, 1,000 feet south of a bridge on Gobey Road over Maden Branch, about 0.5 mile northeast of Elizabeth; USGS Gobey Quadrangle:

Ap—0 to 5 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

BE—5 to 8 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

Bw1—8 to 25 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; very friable; common fine and medium roots; very strongly acid; gradual wavy boundary.

Bw2—25 to 43 inches; dark yellowish brown (10YR 4/6) loam; weak fine subangular blocky structure; very friable; common fine and medium roots; 5 percent rounded and subrounded gravel; very strongly acid; gradual wavy boundary.

C—43 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; massive; very friable; few medium distinct strong brown (7.5YR 5/6) and common medium distinct dark yellowish brown (10YR 4/6) irregular iron masses in the matrix; 40 percent rounded and subrounded gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 30 to 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and pebbles of sandstone, shale, and siltstone

*Reaction:* Extremely acid to strongly acid, except in limed areas

#### Ap horizon:

Hue—10YR

Value—3 to 6

Chroma—3 to 6

Texture—loam

Content of rock fragments—0 to 15 percent

#### BE horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 6

Texture of the fine-earth fraction—loam, silt loam, fine sandy loam, or sandy loam

Content of rock fragments—0 to 20 percent

#### Bw horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 6

Redoximorphic features—some profiles have iron depletions in shades of gray below a depth of 40 inches

Texture of the fine-earth fraction—loam, silt loam, fine sandy loam, or sandy loam

Content of rock fragments—0 to 20 percent

#### C horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—3 to 6

Redoximorphic features—iron masses in shades of brown or red; some profiles have iron depletions in shades of gray below a depth of 40 inches

Texture of the fine-earth fraction—loamy sand, loam, fine sandy loam, or sandy loam

Content of rock fragments—0 to 50 percent

## Ramsey Series

*Depth class:* Shallow and very shallow

*Drainage class:* Somewhat excessively drained

*Permeability:* Rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Ridgetops, shoulder slopes, backslopes, and the upper part of side slopes

*Parent material:* Residuum from sandstone

*Slope range:* 5 to 60 percent

*Associated soils:* Lily, Hendon, and Lonewood soils on adjacent uplands

*Taxonomic class:* Loamy, siliceous, subactive, mesic Lithic Dystrudepts

### Typical Pedon

Ramsey loam in an area of Ramsey-Rock outcrop complex, 5 to 12 percent slopes; in Cumberland County, Tennessee; 0.7 mile east of Fairfield Glade headquarters, 0.3 mile south on a paved road, 100 feet west, in an area of woodland; USGS Fox Creek Quadrangle:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 2 inches; dark yellowish brown (10YR 4/4) loam; weak medium granular structure; very

friable; many fine and medium roots; 10 percent rock fragments as much as 4 inches in diameter; strongly acid; clear smooth boundary.

Bw1—2 to 15 inches; dark yellowish brown (10YR 4/6) loam; weak medium subangular blocky structure; friable; many fine and medium roots; 10 percent rock fragments as much as 4 inches in diameter; strongly acid; clear smooth boundary.

Bw2—15 to 18 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; common fine and medium roots; 10 percent rock fragments as much as 4 inches in diameter; strongly acid.

R—18 inches; hard sandstone bedrock.

#### Range in Characteristics

*Thickness of the solum:* 7 to 20 inches

*Depth to bedrock:* 7 to 20 inches

*Size and kind of rock fragments:* Gravel, channers, flagstones, and cobbles of sandstone

*Reaction:* Very strongly acid or strongly acid

#### A horizon:

Hue—10YR

Value—3 or 4

Chroma—2 to 4

Texture of the fine-earth fraction—loam

Content of rock fragments—5 to 35 percent

#### Bw horizon:

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 6

Texture of the fine-earth fraction—loam, sandy loam, or fine sandy loam

Content of rock fragments—5 to 35 percent

#### R horizon:

Texture—hard sandstone

### Rockdell Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderately rapid

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains and drainageways near cherty uplands

*Parent material:* Mixed alluvium from cherty limestone and shale

*Slope range:* 0 to 3 percent

*Associated soils:* Dewey, Fullerton, and Pailo soils on adjacent uplands; Tasso and Minvale soils on adjacent footslopes

*Taxonomic class:* Loamy-skeletal, siliceous, active, thermic Dystric Fluventic Eutrudepts

#### Typical Pedon

Rockdell gravelly loam, occasionally flooded; in McMinn County, Tennessee; about 5.5 miles west of Riceville on County Road 100, about 600 feet east and 190 feet south of the intersection of County Road 110 and an unnamed tributary of Rogers Creek; USGS Riceville Quadrangle:

Oi—1 inch to 0; partially decomposed leaves, twigs, and roots.

Ap—0 to 10 inches; brown (10YR 4/3) gravelly loam; weak fine granular structure; very friable; many fine and few coarse roots; 20 percent chert gravel; moderately acid; clear smooth boundary.

Bw1—10 to 18 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; common fine and few coarse roots; 30 percent chert gravel; slightly acid; clear smooth boundary.

Bw2—18 to 29 inches; yellowish brown (10YR 5/6) extremely gravelly loam; weak fine subangular blocky structure; friable; common fine and few medium roots; few medium prominent black (10YR 2/1) manganese coatings on rock fragments; 60 percent chert gravel; slightly acid; clear smooth boundary.

C—29 to 41 inches; light yellowish brown (2.5Y 6/3) very gravelly loam; massive; friable; few fine roots; common medium prominent black (10YR 2/1) manganese masses in the matrix; few fine prominent yellowish brown (10YR 5/6) iron masses in the matrix; 30 percent chert gravel and 25 percent chert cobbles; slightly acid; clear smooth boundary.

2Bt—41 to 60 inches; strong brown (7.5YR 5/8) very cobbly clay loam; moderate medium subangular blocky structure; friable; few fine roots; few medium prominent black (10YR 2/1) manganese masses in the matrix; common medium distinct yellowish red (5YR 5/6) masses in the matrix; common medium prominent light gray (2.5Y 7/2) iron depletions in the matrix; 25 percent chert cobbles and 20 percent chert gravel; moderately acid.

#### Range in Characteristics

*Thickness of the solum:* 20 to more than 40 inches

*Depth to bedrock:* More than 60 inches

*Depth to iron depletions with chroma of 2 or less:*  
More than 40 inches

*Size and kind of rock fragments:* Gravel and cobbles

of mostly chert with some limestone, shale, and sandstone

*Reaction:* Moderately acid or slightly acid

*Ap horizon:*

Hue—10YR

Value—4 or 5

Chroma—2 to 4

Texture of the fine-earth fraction—loam

Content of rock fragments—10 to 40 percent

*Bw horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—3 to 6

Redoximorphic features—manganese and iron masses and concretions in shades of brown, red, or black

Texture of the fine-earth fraction—loam, clay loam, silt loam, or silty clay loam

Content of rock fragments—15 to 70 percent

*C horizon:*

Hue—7.5YR to 2.5Y

Value—4 to 6

Chroma—3 to 6

Redoximorphic features—manganese and iron masses and concretions in shades of brown, red, or black; iron depletions in shades of gray occur below a depth of 40 inches

Texture of the fine-earth fraction—loam, sandy loam, clay loam, silt loam, or silty clay loam

Content of rock fragments—15 to 70 percent

*2Bt horizon:*

Hue—2.5YR to 10YR

Value—4 to 6

Chroma—4 to 8

Redoximorphic features—manganese and iron masses and concretions in shades of brown, yellow, red, or black; iron depletions in shades of gray

Texture of the fine-earth fraction—clay loam, loam, clay, or silty clay

Content of rock fragments—15 to 70 percent

## **Salacoa Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Footslopes and the lower portions of side slopes and backslopes

*Parent material:* Colluvium and the underlying residuum from interbedded sandstone and shale

*Slope range:* 5 to 65 percent

*Associated soils:* Apison, Sunlight, and Townley soils

*Taxonomic class:* Fine-loamy, mixed, active, thermic Typic Hapludalfs

### **Typical Pedon**

Salacoa silt loam in an area of Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes; in Rhea County, Tennessee; about 7.1 miles east of Dayton on State Road 30, about 4.2 miles north on State Road 302, about 1.8 miles east on Breedenton Ferry Road, 0.5 mile north on Smith Bend Road, 650 feet southeast of Smith Bend Road; USGS Decatur Quadrangle:

Oi—1 inch to 0; slightly decomposed leaf litter.

A—0 to 5 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; very friable; many fine and common medium roots; 11 percent shale channers; moderately acid; clear smooth boundary.

Bt1—5 to 20 inches; yellowish brown (10YR 5/6) gravelly silt loam; weak fine subangular blocky structure; very friable; many fine and few medium and coarse roots; few distinct clay films on faces of peds and on rock fragments; 21 percent sandstone gravel and shale channers; very strongly acid; clear wavy boundary.

Bt2—20 to 35 inches; brown (7.5YR 4/4) gravelly silt loam; many medium prominent light olive brown (2.5Y 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds and rock fragments; 29 percent sandstone gravel and shale channers; very strongly acid; clear wavy boundary.

BC—35 to 62 inches; brown (7.5YR 4/4) very gravelly silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; common fine roots; 35 percent sandstone gravel and shale channers; very strongly acid; abrupt wavy boundary.

Cr—62 inches; soft shale interbedded with reddish sandstone and siltstone.

### **Range in Characteristics**

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Channers and gravel of sandstone, siltstone, and shale

*Reaction:* Very strongly acid to moderately acid, except in limed areas

*A horizon:*

Hue—7.5YR or 10YR  
 Value—3 or 4  
 Chroma—3 to 6  
 Texture of the fine-earth fraction—silt loam  
 Content of rock fragments—5 to 30 percent

*Bt horizon:*

Hue—5YR to 10YR  
 Value—4 to 6  
 Chroma—4 to 6  
 Texture of the fine-earth fraction—silt loam, loam, silty clay loam, or clay loam  
 Content of rock fragments—5 to 30 percent

*BC horizon:*

Hue—5YR to 10YR  
 Value—4 or 5  
 Chroma—4 to 8  
 Mottles (if they occur)—in shades of red, yellow, or brown  
 Texture of the fine-earth fraction—silt loam, loam, silty clay loam, or clay loam  
 Content of rock fragments—5 to 40 percent

*Cr horizon:*

Texture and color—weathered, interbedded shale, siltstone, and sandstone in shades of brown or red

**Sequoia Series**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Side slopes

*Parent material:* Residuum weathered from acid shale

*Slope range:* 20 to 35 percent

*Associated soils:* Gilpin soils on side slopes and shoulder slopes; Lily and Lonewood soils on ridge crests

*Taxonomic class:* Fine, mixed, semiactive, mesic Typic Hapludults

**Typical Pedon**

Sequoia silt loam, 12 to 20 percent slopes; in Morgan County, Tennessee; on a south-facing side slope in Walls Hollow, 25 yards east of Coal Hill Road, 1.6 miles east of the intersection of U.S. Highway 27 and Coal Hill Road, 300 yards south of Coal Hill; USGS Elverton Quadrangle:

A—0 to 1 inch; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; common

fine and medium roots; 2 percent shale channers as much as 1/2 inch across; very strongly acid; abrupt smooth boundary.

Bt1—1 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 5 percent shale channers as much as 1/2 inch across; very strongly acid; clear smooth boundary.

Bt2—12 to 27 inches; yellowish red (5YR 5/6) channery silty clay; strong medium angular and subangular blocky structure; firm; few fine roots; common distinct clay films on faces of peds; 15 percent shale channers as much as 1 inch across; very strongly acid; abrupt wavy boundary.

Cr—27 to 31 inches; rippable shale bedrock.

**Range in Characteristics**

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and channers of shale and siltstone

*Reaction:* Very strongly acid or strongly acid

*A horizon:*

Hue—10YR  
 Value—3 to 5  
 Chroma—2 to 4  
 Texture—silt loam  
 Content of rock fragments—0 to 10 percent

*Bt horizon:*

Hue—5YR to 10YR  
 Value—4 or 5  
 Chroma—4 to 8  
 Mottles (if they occur)—in shades of red or brown in the lower part of horizon  
 Texture—silty clay loam, silty clay, or clay  
 Content of rock fragments—0 to 20 percent

*Cr horizon:*

Texture—rippable shale and siltstone

**Shady Series**

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains, low stream terraces, and alluvial fans

*Parent material:* Alluvium

*Slope range:* 0 to 5 percent

*Associated soils:* Cobstone soils in the same landform

positions as the Shady soils; Allen soils on footslopes; Hamblen soils on adjacent flood plains

*Taxonomic class:* Fine-loamy, mixed, subactive, thermic Typic Hapludults

### Typical Pedon

Shady loam, 1 to 5 percent slopes; in Rhea County, Tennessee; about 1.3 miles west of Dayton on State Road 30, about 0.4 mile south on Delaware Avenue, 900 feet west of Delaware Avenue; USGS Graysville Quadrangle:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular structure; very friable; common fine roots; neutral; clear smooth boundary.

Bt1—8 to 25 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of pedis; 2 percent rounded sandstone gravel; slightly acid; clear smooth boundary.

Bt2—25 to 32 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint clay films on faces of pedis; 2 percent rounded sandstone gravel; moderately acid; clear smooth boundary.

BC1—32 to 42 inches; yellowish brown (10YR 5/8) loam; weak fine subangular blocky structure; friable; 5 percent rounded sandstone gravel; moderately acid; clear smooth boundary.

BC2—42 to 72 inches; yellowish brown (10YR 5/8) very cobbly sandy loam; weak fine subangular blocky structure; friable; 40 percent sandstone cobbles and gravel; strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone and chert

*Reaction:* Very strongly acid to moderately acid, except in limed areas

#### Ap horizon:

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—3 or 4

Texture—loam

Content of rock fragments—0 to 15 percent

#### Bt horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—6 to 8

Mottles and redoximorphic features (if they occur)—mottles in shades of yellow, red, or brown; some profiles have iron and manganese masses and concretions in shades of brown, red, or black and iron depletions in shades of gray below a depth of 40 inches  
Texture—clay loam, sandy clay loam, or loam  
Content of rock fragments—0 to 15 percent

#### BC horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—6 to 8

Mottles and redoximorphic features (if they occur)—mottles in shades of yellow, red, or brown; some profiles have iron and manganese masses and concretions in shades of brown, red, or black and iron depletions in shades of gray below a depth of 40 inches  
Texture—loam, sandy clay loam, or sandy loam  
Content of rock fragments—5 to 60 percent

## Shelocta Series

*Depth class:* Deep and very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Upland side slopes

*Parent material:* Colluvium from sandstone over shale and siltstone residuum

*Slope range:* 10 to 60 percent

*Associated soils:* Jefferson and Varilla soils

*Taxonomic class:* Fine-loamy, mixed, active, mesic Typic Hapludults

### Typical Pedon

Shelocta loam in an area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony; in Cumberland County, Tennessee; 6.6 miles northeast of the intersection of Interstate Highway 40 and Highway 298, about 0.3 mile east of Highway 298 and River Road, 300 feet south of River Road, by the Obed River, 300 feet south; USGS Fox Creek Quadrangle:

A—0 to 1 inch; dark brown (10YR 3/3) loam; weak medium granular structure; very friable; many fine to coarse roots; 10 percent hard sandstone fragments as much as 3 inches in diameter; strongly acid; clear smooth boundary.

E—1 to 3 inches; yellowish brown (10YR 5/4) loam; moderate medium granular structure; very friable;

many fine to coarse roots; 10 percent hard sandstone channers as much as 3 inches in length; strongly acid; clear smooth boundary.

BE—3 to 11 inches; yellowish brown (10YR 5/6) loam; weak fine and medium subangular blocky structure; very friable; common fine to coarse roots; 10 percent hard sandstone channers as much as 3 inches in length; strongly acid; clear smooth boundary.

Bt1—11 to 21 inches; yellowish brown (10YR 5/8) silty clay loam; moderate medium subangular blocky structure; friable; common fine and medium roots; few faint clay films on faces of peds; 10 percent hard sandstone channers as much as 3 inches in length; strongly acid; clear smooth boundary.

2Bt2—21 to 32 inches; yellowish brown (10YR 5/8) silty clay loam; common medium distinct yellowish brown (10YR 5/4) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct yellowish brown (10YR 5/6) clay films on faces of peds; 10 percent shale channers as much as 3 inches in length; strongly acid; gradual smooth boundary.

2Bt3—32 to 40 inches; brownish yellow (10YR 6/8) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) mottles; strong fine and medium subangular blocky structure; firm; few fine roots; common distinct brownish yellow (10YR 6/6) clay films on faces of peds; 10 percent shale channers as much as 3 inches in length; strongly acid; gradual smooth boundary.

2BC—40 to 50 inches; 34 percent brownish yellow (10YR 6/6), 33 percent pale brown (10YR 6/3), and 33 percent strong brown (7.5YR 5/6) channery silty clay loam; weak medium platy structure; friable; 30 percent shale channers as much as 3 inches in length; strongly acid; gradual smooth boundary.

2Cr—50 to 60 inches; multicolored shale bedrock.

### Range in Characteristics

*Thickness of the solum:* 48 to 60 inches or more

*Depth to bedrock:* More than 48 inches

*Size and kind of rock fragments:* Channers and gravel of shale and sandstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*A horizon:*

Hue—10YR

Value—3 or 4

Chroma—2 to 4

Texture—loam

Content of rock fragments—5 to 35 percent

*E horizon:*

Hue—10YR

Value—5 to 7

Chroma—4

Texture—loam

Content of rock fragments—5 to 35 percent

*BE horizon:*

Hue—10YR

Value—4 to 6

Chroma—4 to 6

Texture—loam or silty clay loam

Content of rock fragments—5 to 35 percent

*Bt horizon:*

Hue—7.5YR or 10YR

Value—4 to 6

Chroma—4 to 8

Texture—silty clay loam or loam

Content of rock fragments—5 to 35 percent

*BC and C horizons:*

Hue—10YR

Value—4 to 6

Chroma—3 to 6

Texture—clay loam or silty clay loam

Content of rock fragments—30 to 70 percent

*Cr horizon:*

Texture—multicolored shale or mudstone with some interlayering of sandstone

## Staser Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate and moderately rapid

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains

*Parent material:* Alluvium

*Slope range:* 0 to 3 percent

*Associated soils:* Egam soils in landform positions similar to those of the Staser soils; Altavista and Etowah soils on adjacent stream terraces

*Taxonomic class:* Fine-loamy, mixed, active, thermic Cumulic Hapludolls

### Typical Pedon

Staser loam; in Hamilton County, Tennessee; on the north shore flood plain of the Tennessee River, on the west side of Moccasin Bend, 500 feet south of Moccasin Bend Psychiatric Hospital, across the river

from Interstate Highway 24; USGS Chattanooga Quadrangle:

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.
- A—10 to 30 inches; dark brown (10YR 3/3) loam; moderate medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.
- Bw—30 to 60 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; very friable; few fine roots; slightly acid.

#### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 72 inches

*Size and kind of rock fragments:* Gravel and cobbles of sandstone and chert

*Reaction:* Very strongly acid to slightly acid

*Ap and A horizons:*

Hue—7.5YR or 10YR

Value—2 or 3

Chroma—2 or 3

Texture—loam

Content of rock fragments—0 to 10 percent

*Bw horizon:*

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—3 or 4

Mottles and redoximorphic features (if they occur)—mottles in shades of brown; iron and manganese masses and concretions in shades of red, brown, or black; iron depletions in shades of gray or brown below a depth of 40 inches

Texture—loam or fine sandy loam

Content of rock fragments—0 to 10 percent

### Sunlight Series

*Depth class:* Shallow

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Narrow convex ridge crests, shoulder slopes, and side slopes

*Parent material:* Residuum from tilted, interbedded shale, siltstone, and sandstone

*Slope range:* 5 to 65 percent

*Associated soils:* Townley, Apison, and Salacoa soils

in landform positions similar to those of the Sunlight soils

*Taxonomic class:* Loamy-skeletal, mixed, semiactive, thermic, shallow Inceptic Hapludults

#### Typical Pedon

Sunlight gravelly loam in an area of Townley-Sunlight complex, 12 to 25 percent slopes; in Rhea County, Tennessee; about 7.1 miles east of Dayton on State Road 30, about 4.2 miles north on State Road 302, about 1.8 miles east on Breedenton Ferry Road, 0.5 mile north on Smith Bend Road, 2,500 feet southeast of Smith Bend Road; USGS Decatur Quadrangle:

Oi—1 inch to 0; slightly decomposed leaves and twigs.

A—0 to 8 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak fine granular structure; very friable; common fine roots; 15 percent sandstone gravel; strongly acid; abrupt smooth boundary.

Bt—8 to 17 inches; strong brown (7.5YR 5/6) very gravelly clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; 40 percent sandstone gravel; common faint clay films on faces of peds; strongly acid; abrupt smooth boundary.

Cr—17 to 48 inches; reddish tilted sandstone and sandy shale that can be dug with a spade.

#### Range in Characteristics

*Thickness of the solum:* 10 to 20 inches

*Depth to soft bedrock:* 10 to 20 inches

*Size and kind of rock fragments:* Channers and gravel of shale, sandstone, and siltstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*A horizon:*

Hue—7.5YR or 10YR

Value—3 or 4

Chroma—1 to 4

Texture of the fine-earth fraction—loam

Content of rock fragments—10 to 25 percent

*Bt horizon:*

Hue—5YR to 10YR

Value—4 or 5

Chroma—4 to 8

Mottles (if they occur)—in shades of red, yellow, or brown

Texture of the fine-earth fraction—clay loam, loam, sandy loam, or silt loam

Content of rock fragments—35 to 80 percent

*Cr horizon:*

Texture and color—reddish to brownish tilted, interbedded shale, sandstone, and siltstone

**Talbott Series**

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low ridges and upland flats and side slopes

*Parent material:* Residuum from limestone

*Slope range:* 5 to 25 percent

*Associated soils:* Lyerly, Capshaw, Colbert, and Conasauga soils and areas of limestone rock outcrop in similar positions

*Taxonomic class:* Fine, mixed, semiactive, thermic Typic Hapludalfs

**Typical Pedon**

Talbott silt loam, 2 to 12 percent slopes; in Hamilton County, Tennessee; 1.25 miles on Morris Hill Road from the intersection of Morris Hill Road and East Brainerd Road, 50 feet west; USGS East Chattanooga Quadrangle:

Ap—0 to 6 inches; yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable; many fine roots; moderately acid; clear smooth boundary.

Bt1—6 to 10 inches; yellowish red (5YR 4/6) clay; few medium distinct brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; many fine roots; common distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—10 to 24 inches; yellowish red (5YR 5/8) clay; common fine and medium prominent yellowish brown (10YR 5/4) mottles; moderate medium angular blocky structure; firm, plastic; few fine roots; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—24 to 36 inches; yellowish brown (10YR 5/6) clay; common fine and medium distinct yellowish red (5YR 4/6) mottles; strong medium and coarse angular blocky structure; very firm, plastic; many distinct clay films on faces of peds; moderately acid; abrupt smooth boundary.

R—36 to 40 inches; hard limestone bedrock.

**Range in Characteristics**

*Thickness of the solum:* 20 to 40 inches

*Depth to bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and flagstones of limestone and chert

*Reaction:* Strongly acid to slightly acid

*Ap horizon:*

Hue—7.5YR or 10YR

Value—3 to 5

Chroma—2 to 4

Texture—silt loam

Content of rock fragments—0 to 10 percent

*Bt horizon:*

Hue—2.5YR to 7.5YR

Value—4 or 5

Chroma—4 to 8

Mottles—in shades of red, yellow, or brown

Texture—clay or silty clay

Content of rock fragments—0 to 10 percent

*R horizon:*

Texture—hard limestone or dolomite

**Tasso Series**

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Footslopes, benches, and fans

*Parent material:* Colluvium, alluvium, and underlying residuum from cherty limestone

*Slope range:* 2 to 25 percent

*Associated soils:* Fullerton, Dewey, and Pailo soils on adjacent ridge crests, shoulder slopes, and side slopes

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Fragic Paleudults

**Typical Pedon**

Tasso gravelly loam in an area of Tasso-Minvale complex, 5 to 12 percent slopes; in Rhea County, Tennessee; about 6.5 miles south of Spring City on U.S. Highway 27, about 300 feet east of U.S. Highway 27; USGS Evensville Quadrangle:

Ap—0 to 7 inches; brown (10YR 4/3) gravelly loam; moderate medium granular structure; friable; many fine roots; 15 percent chert gravel; slightly acid; clear smooth boundary.

Bt1—7 to 20 inches; yellowish brown (10YR 5/8) gravelly clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint

clay films on faces of peds; 15 percent chert gravel; moderately acid; clear smooth boundary.

**Bt2**—20 to 26 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds; common medium prominent pinkish gray (7.5YR 6/2) iron depletions on faces of peds; 15 percent chert gravel; strongly acid; clear smooth boundary.

**Btx**—26 to 34 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky and weak prismatic structure; firm; common distinct clay films on faces of peds; common medium prominent pinkish gray (7.5YR 6/2) iron depletions on faces of peds; 20 percent chert gravel; 50 percent brittleness; strongly acid; clear smooth boundary.

**2Bt1**—34 to 44 inches; strong brown (7.5YR 5/6) gravelly loam; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds; common medium distinct light brown (7.5YR 6/3) iron depletions on faces of peds; 25 percent chert gravel; strongly acid; clear smooth boundary.

**2Bt2**—44 to 54 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds; common medium prominent pinkish gray (7.5YR 6/2) iron depletions on faces of peds; 20 percent chert gravel; strongly acid; clear smooth boundary.

**2BC**—54 to 72 inches; yellowish brown (10YR 5/6) gravelly clay loam; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common medium distinct strong brown (7.5YR 5/8) iron masses and common medium prominent pinkish gray (7.5YR 6/2) iron depletions in the matrix; 20 percent chert gravel; strongly acid.

#### **Range in Characteristics**

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and cobbles of chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *Ap horizon:*

Hue—10YR

Value—3 to 5

Chroma—2 to 4

Texture of the fine-earth fraction—loam

Content of rock fragments—10 to 25 percent

#### *Bt horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 8

Mottles and redoximorphic features—mottles in shades of yellow, red, or brown; iron depletions in shades of brown or gray, generally occurring below a depth of 20 inches

Texture of the fine-earth fraction—clay loam, silty clay loam, silt loam, loam, or, rarely, clay

Content of rock fragments—10 to 25 percent

#### *Btx horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of red, brown, or black; iron depletions in shades of gray or brown, generally occurring below a depth of 20 inches

Texture of the fine-earth fraction—clay loam, silty clay loam, silt loam, or loam

Content of rock fragments—10 to 35 percent

#### *2Bt and 2BC horizons:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—6 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of red, brown, or black; iron depletions in shades of gray or brown

Texture of the fine-earth fraction—clay loam, silty clay loam, or clay

Content of rock fragments—10 to 50 percent

## ***Townley Series***

*Depth class:* Moderately deep

*Drainage class:* Well drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridge crests, side slopes, and backslopes

*Parent material:* Residuum from tilted and fractured acid shale

*Slope range:* 2 to 25 percent

*Associated soils:* Sunlight and Apison soils in landform positions similar to those of the Townley soils

*Taxonomic class:* Fine, mixed, semiactive, thermic Typic Hapludults

### Typical Pedon

Townley silt loam in an area of Townley-Sunlight complex, 12 to 25 percent slopes; in Rhea County, Tennessee; about 4.1 miles north of Spring City on U.S. Highway 27, about 2.8 miles southeast on Rocky Springs Road, 0.4 mile northeast on a logging road, in a clearcut; USGS Spring City Quadrangle:

Ap—0 to 3 inches; brown (10YR 4/3) silt loam;

moderate fine subangular blocky structure; very friable; common fine roots; 5 percent sandstone gravel; strongly acid; abrupt smooth boundary.

Bt1—3 to 12 inches; strong brown (7.5YR 5/6) clay; strong medium subangular blocky and moderate medium angular blocky structure; firm, sticky, plastic; few fine and medium roots; 5 percent sandstone gravel; many distinct clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—12 to 20 inches; strong brown (7.5YR 5/6) clay; few fine faint brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, sticky, plastic; few fine and common medium roots; common distinct clay films on faces of peds; 5 percent shale channers and sandstone gravel; very strongly acid; clear smooth boundary.

BC—20 to 28 inches; strong brown (7.5YR 5/8) clay; common fine prominent light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure; firm, sticky, plastic; 5 percent shale channers and sandstone gravel; very strongly acid; abrupt wavy boundary.

Cr—28 to 60 inches; light yellowish brown tilted sandy shale and siltstone that can be dug with a spade.

### Range in Characteristics

*Thickness of the solum:* 20 to 40 inches

*Depth to soft bedrock:* 20 to 40 inches

*Size and kind of rock fragments:* Channers and gravel of shale, sandstone, and siltstone

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### Ap horizon:

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 6

Texture of the fine-earth fraction—silt loam or loam

Content of rock fragments—5 to 20 percent

#### Bt horizon:

Hue—5YR or 7.5YR

Value—4 or 5

Chroma—4 to 8

Mottles (if they occur)—in shades of red, yellow, or brown

Texture of the fine-earth fraction—clay, silty clay, or silty clay loam

Content of rock fragments—5 to 20 percent

#### BC horizon:

Hue—5YR to 10YR

Value—4 to 6

Chroma—6 to 8

Mottles (if they occur)—in shades of red, yellow, brown, or olive; some horizons are variegated without a dominant color

Texture of the fine-earth fraction—clay, silty clay, silty clay loam, clay loam, or loam

Content of rock fragments—0 to 20 percent

#### Cr horizon:

Texture and color—olive, brown, or yellow fractured and tilted shale and siltstone

## Tupelo Series

*Depth class:* Very deep

*Drainage class:* Somewhat poorly drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Flood plains and drainageways in areas of upland flats

*Parent material:* Alluvium and underlying residuum from interbedded argillaceous limestone and calcareous shale

*Slope range:* 0 to 3 percent

*Associated soils:* Ketona soils in the same landform positions as the Tupelo soils; Colbert, Capshaw, Lyerly, and Conasauga soils and areas of limestone rock outcrop on adjacent uplands

*Taxonomic class:* Fine, mixed, semiactive, thermic Aquic Hapludalfs

### Typical Pedon

Tupelo silt loam; in Hamilton County, Tennessee; in an area off East Brainerd Road, 500 feet from Mackey Creek, 100 feet north of a private road; USGS East Chattanooga Quadrangle:

Ap—0 to 8 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; friable; common fine roots; few fine faint light olive brown (2.5Y 5/4) iron depletions; slightly acid; abrupt smooth boundary.

BA—8 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few fine distinct

light olive brown (2.5Y 5/4) depletions in the matrix; slightly acid; clear wavy boundary.

**Bt1**—16 to 26 inches; light olive brown (2.5Y 5/4) silty clay; moderate medium subangular blocky structure; firm; few fine roots; common faint clay films on faces of peds; many coarse distinct yellowish brown (10YR 5/6) iron masses on faces of peds; common fine prominent brownish gray (2.5Y 6/2) irregular iron depletions on faces of peds; slightly acid; gradual wavy boundary.

**Bt2**—26 to 32 inches; pale olive (5Y 6/3) clay; moderate medium angular blocky structure; firm; many distinct clay films; many medium prominent brown (7.5YR 4/4) iron masses on faces of peds; many medium faint light brownish gray (2.5Y 6/2) iron depletions on faces of peds; moderately acid; gradual smooth boundary.

**Btg**—32 to 48 inches; light brownish gray (2.5Y 6/2) clay; moderate medium angular blocky structure; firm; many distinct clay films; many fine and medium prominent yellowish brown (10YR 5/6) and brown (7.5YR 4/4) iron masses in the matrix; moderately acid; gradual smooth boundary.

**Cg**—48 to 60 inches; gray (N 6/0) clay; massive; very firm; many medium prominent strong brown (7.5YR 5/6) irregular iron masses in the matrix; slightly acid.

### Range in Characteristics

*Thickness of the solum:* 40 to more than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Gravel and flagstones of limestone and chert

*Nodules, concretions, and masses of iron and manganese:* None or few in the A horizon; few to many in the Bt, Btg, and Cg horizons

*Reaction:* Strongly acid to moderately alkaline

#### *Ap horizon:*

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—2 to 4

Texture—silt loam

Content of rock fragments—0 to 5 percent

#### *BA horizon:*

Hue—10YR or 2.5Y

Value—5 or 6

Chroma—3 to 8

Redoximorphic features (if they occur)—iron and manganese masses and concretions in shades of red, brown, or black; iron depletions in shades of brown or yellow

Texture—silt loam or silty clay loam

Content of rock fragments—0 to 5 percent

#### *Bt horizon:*

Hue—10YR to 5Y

Value—4 to 6

Chroma—3 to 6

Redoximorphic features—iron and manganese masses and concretions in shades of red, brown, or black; iron depletions in shades of gray, olive, brown, or yellow; features with chroma of 2 or less occur in the upper 10 inches of horizon

Texture—clay or silty clay

Content of rock fragments—0 to 5 percent

#### *Btg horizon:*

Hue—10YR to 5Y or neutral

Value—5 or 6

Chroma—0 to 2

Redoximorphic features—iron and manganese masses and concretions in shades of red, brown, or black; a reduced matrix in shades of gray

Texture—clay or silty clay

Content of rock fragments—0 to 5 percent

#### *Cg horizon:*

Hue—10YR to 5Y or neutral

Value—5 or 6

Chroma—0 to 2

Redoximorphic features—iron and manganese masses and concretions in shades of red, brown, or black; a reduced matrix in shades of gray

Texture—clay or silty clay

Content of rock fragments—0 to 5 percent

## Udorthents

*Depth class:* Very deep

*Drainage class:* Well drained to excessively drained

*Permeability:* Very slow to moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Landscape position:* Uplands, flood plains, and drainageways

*Parent material:* Variable, depending on the source of soil material

*Slope range:* 2 to 12 percent

### Typical Pedon

A typical pedon is not given because these soils vary greatly. Most areas of Udorthents have been excavated or filled. Udorthents have colors in shades of red, yellow, brown, olive, or gray. Their textures vary.

### Range in Characteristics

*Depth to bedrock:* Generally more than 60 inches

*Size and kind of rock fragments:* Variable; typically gravel, cobbles, and stones of chert, shale, limestone, or sandstone

*Reaction:* Extremely acid to neutral

*Depth to seasonal high water table:* Generally more than 60 inches

## Varilla Series

*Depth class:* Deep and very deep

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid

*Physiographic area:* Cumberland Plateau and Mountains

*Position on the landform:* Convex side slopes and footslopes below sandstone escarpments

*Parent material:* Colluvium from sandstone

*Slope range:* 10 to 60 percent

*Associated soils:* Jefferson and Shelocta soils in the same landform positions as the Varilla soils

*Taxonomic class:* Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts

### Typical Pedon

Varilla very cobbly sandy loam in an area of Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony; in Cumberland County, Tennessee; 2 miles northeast of U.S. Highway 127 on Tabor Loop, east to the end of McCampbell Road, 600 feet north; USGS Fox Creek Quadrangle:

Oi—1 inch to 0; partially decomposed leaf litter.

A—0 to 1 inch; very dark grayish brown (10YR 3/2) very cobbly sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 40 percent cobbles and stones as much as 16 inches in diameter; strongly acid; abrupt smooth boundary.

BE—1 to 7 inches; brown (10YR 4/3) very cobbly sandy loam; weak medium granular structure; very friable; many fine to coarse roots; 40 percent cobbles and stones as much as 16 inches in diameter; strongly acid; clear smooth boundary.

Bw1—7 to 28 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak coarse subangular blocky structure; very friable; common fine and few medium and coarse roots; 40 percent cobbles as much as 8 inches in diameter; very strongly acid; gradual smooth boundary.

Bw2—28 to 44 inches; dark yellowish brown (10YR 4/6) very cobbly sandy loam; weak coarse subangular blocky structure; very friable; common

fine and few medium and coarse roots; 50 percent cobbles as much as 8 inches in diameter; very strongly acid; gradual smooth boundary.

C—44 to 60 inches; yellowish brown (10YR 5/6) very cobbly sandy loam; massive; very friable; 60 percent cobbles as much as 8 inches in diameter; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 40 to 60 inches

*Depth to bedrock:* 48 to more than 60 inches

*Size and kind of rock fragments:* Gravel, cobbles, and stones of sandstone

*Reaction:* Extremely acid to strongly acid

*A horizon:*

Hue—10YR

Value—3 or 4

Chroma—2 or 3

Texture of the fine-earth fraction—sandy loam

Content of rock fragments—15 to 75 percent

*BE horizon:*

Hue—10YR

Value—4 or 5

Chroma—3 or 4

Texture—loam or sandy loam

Content of rock fragments—15 to 75 percent

*Bw horizon:*

Hue—7.5YR or 10YR

Value—4 or 5

Chroma—4 to 6

Texture—loam, fine sandy loam, or sandy loam

Content of rock fragments—15 to 75 percent

*C horizon:*

Hue—10YR

Value—5 or 6

Chroma—3 to 6

Texture—sandy loam, fine sandy loam, or loamy sand

Content of rock fragments—35 to 90 percent

## Wax Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Drainageways and terraces or toeslopes near cherty uplands

*Parent material:* Alluvium or colluvium containing a large amount of chert gravel, cobbles, and stones

*Slope range:* 0 to 3 percent

*Associated soils:* Rockdell soils in the same landform positions as the Wax soils; Minvale and Tasso soils on adjacent footslopes; Dewey, Fullerton, and Pailo soils on adjacent uplands

*Taxonomic class:* Fine-loamy, siliceous, semiactive, thermic Typic Fragiuults

### Typical Pedon

Wax gravelly loam in an area of Wax-Rockdell complex, 0 to 3 percent slopes, occasionally flooded; in Rhea County, Tennessee; about 6.8 miles east of Dayton on State Road 30, about 1.3 miles northwest on Pete Worthington Road, 200 feet northeast of Pete Worthington Road; USGS Evensville Quadrangle:

A—0 to 4 inches; brown (10YR 4/3) gravelly loam; moderate fine granular structure; very friable; many fine roots; 30 percent chert gravel; strongly acid; clear smooth boundary.

AB—4 to 9 inches; dark yellowish brown (10YR 4/4) gravelly loam; weak fine granular structure; very friable; common fine roots; 15 percent chert gravel; strongly acid; clear smooth boundary.

Bt1—9 to 17 inches; yellowish brown (10YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; few distinct clay films on faces of peds; few fine roots; 30 percent chert gravel; strongly acid; gradual smooth boundary.

Bt2—17 to 28 inches; yellowish brown (10YR 5/8) gravelly clay loam; moderate medium subangular blocky structure; friable; few fine roots; many medium prominent pale brown (10YR 6/3) iron depletions in the matrix; common medium distinct strong brown (7.5YR 5/6) iron masses on faces of peds; 30 percent chert gravel; strongly acid; abrupt smooth boundary.

Btx—28 to 46 inches; yellowish brown (10YR 5/6) very gravelly clay loam; weak fine prismatic structure; very firm; many medium black (10YR 2/1) manganese masses coating faces of peds and gravel; common medium faint strong brown (7.5YR 5/6) iron masses coating faces of peds and gravel; many medium distinct pale brown (10YR 6/3) and few fine prominent light brownish gray (10YR 6/2) iron depletions in the matrix; 50 percent chert gravel; strongly acid; gradual wavy boundary.

2Bt—46 to 72 inches; variegated brownish yellow (10YR 6/6), red (2.5YR 4/6), and strong brown (7.5YR 5/6) very gravelly clay; moderate medium angular blocky structure; firm; many coarse prominent light gray (10YR 7/2) iron depletions; 50 percent rounded chert and sandstone gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Depth to fragipan:* 15 to 40 inches

*Depth to iron depletions with chroma of 2 or less:* 20 to 40 inches

*Size and kind of rock fragments:* Gravel and cobbles of chert and some sandstone

*Reaction:* Strongly acid or very strongly acid

#### A horizon:

Hue—10YR

Value—3 to 5

Chroma—3 or 4

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—15 to 30 percent

#### AB horizon:

Hue—10YR

Value—3 to 5

Chroma—3 to 6

Texture of the fine-earth fraction—loam or silt loam

Content of rock fragments—15 to 30 percent

#### Bt horizon:

Hue—7.5YR or 10YR

Value—5 or 6

Chroma—4 to 8

Redoximorphic features (if they occur)—iron and manganese masses and concretions in shades of brown, yellow, red, or black; iron depletions in shades of brown

Texture of the fine-earth fraction—loam, clay loam, or silty clay loam

Content of rock fragments—15 to 30 percent

#### Btx horizon:

Hue—7.5YR or 10YR

Value—5 or 6

Chroma—4 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown, yellow, red, or black; iron depletions in shades of brown or gray

Texture of the fine-earth fraction—loam, clay loam, or silty clay loam

Content of rock fragments—35 to 65 percent

#### 2Bt horizon:

Hue—2.5YR to 10YR

Value—4 to 6

Chroma—4 to 8

Redoximorphic features—iron and manganese masses and concretions in shades of brown,

yellow, red, or black; iron depletions in shades of gray; in many pedons horizon is variegated without dominant hue or chroma

Texture of the fine-earth fraction—clay or clay loam

Content of rock fragments—30 to 65 percent

## Waynesboro Series

*Depth class:* Very deep

*Drainage class:* Well drained

*Permeability:* Moderate

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Ridges and side slopes

*Parent material:* Old alluvium from sandstone, shale, and limestone

*Slope range:* 2 to 25 percent

*Associated soils:* Dewey and Fullerton soils

*Taxonomic class:* Fine, kaolinitic, thermic Typic Paleudults

### Typical Pedon

Waynesboro loam, 5 to 12 percent slopes, eroded; in Rhea County, Tennessee; about 2.0 miles south of Spring City on U.S. Highway 27, about 0.3 mile west on Ideal Valley Road, 425 feet south of Ideal Valley Road, in a pasture; USGS Pennine Quadrangle:

Ap1—0 to 5 inches; dark brown (7.5YR 3/2) loam; moderate medium granular structure; friable; many fine roots; neutral; clear smooth boundary.

Ap2—5 to 11 inches; dark brown (7.5YR 3/3) clay loam; weak medium subangular blocky structure; common fine roots; neutral; clear smooth boundary.

Bt1—11 to 25 inches; dark reddish brown (5YR 3/4) clay; moderate fine subangular blocky structure; friable; few fine roots; common faint clay films on faces of peds and lining pores; few fine prominent black (10YR 2/1) manganese concretions in the matrix; neutral; clear smooth boundary.

Bt2—25 to 37 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; friable; common distinct clay films on faces of peds and lining pores; few fine prominent black (10YR 2/1) manganese concretions in the matrix; 2 percent rounded gravel; slightly acid; clear smooth boundary.

Bt3—37 to 65 inches; red (2.5YR 4/6) gravelly clay; few medium prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; friable; common prominent clay films on faces of peds and lining pores; few fine

manganese concretions in the matrix; 25 percent rounded gravel; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* More than 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Pebbles and gravel of sandstone, quartzite, and chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

*Ap horizon:*

Hue—5YR or 7.5YR

Value—3 to 5

Chroma—2 to 8

Texture—loam

Content of rock fragments—0 to 10 percent

*Bt horizon:*

Hue—dominantly 2.5YR or 5YR; 7.5YR in the upper part of horizon

Value—4 or 5

Chroma—4 to 8

Mottles—in shades of yellow, red, or brown

Texture—clay or clay loam

Content of rock fragments—mostly 0 to 10 percent; some profiles have as much as 30 percent below a depth of 36 inches

## Wolftever Series

*Depth class:* Very deep

*Drainage class:* Moderately well drained

*Permeability:* Moderately slow

*Physiographic area:* Southern Appalachian Ridges and Valleys

*Position on the landform:* Low stream terraces

*Parent material:* Alluvium weathered from sandstone, shale, and limestone

*Slope range:* 2 to 5 percent

*Associated soils:* Egam and Altavista soils in landform positions similar to those of the Wolftever soils; Etowah, Holston, and Waynesboro soils on the higher terraces

*Taxonomic class:* Fine, mixed, semiactive, thermic Aquic Hapludults

### Typical Pedon

Wolftever silt loam, 2 to 5 percent slopes; in Rhea County, Tennessee; about 3.8 miles east of Dayton on State Road 30, about 3.9 miles east on Cottonport Road, 0.4 mile south on a private road, 250 feet west of the private road; USGS Big Spring Quadrangle:

Ap—0 to 8 inches; dark yellowish brown (10YR 4/4)

silt loam; moderate medium granular structure; friable; common fine roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 24 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; friable; few fine roots; common faint strong brown (7.5YR 5/6) clay films on faces of peds and lining pores; few fine prominent black (10YR 2/1) manganese masses in the matrix; common fine prominent pale yellow (2.5Y 7/3) iron depletions in the matrix; common fine flakes of mica; 2 percent rounded sandstone gravel; strongly acid; clear smooth boundary.

Bt2—24 to 38 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; friable; very few fine roots; common distinct clay films on faces of peds and lining pores; few fine prominent black (10YR 2/1) manganese masses in the matrix; common medium prominent light gray (2.5Y 7/2) iron depletions in the matrix; common fine flakes of mica; very strongly acid; clear wavy boundary.

Bt3—38 to 46 inches; variegated yellowish brown (10YR 5/8), light gray (2.5Y 7/2), and strong brown (7.5YR 5/6) silty clay; weak medium subangular blocky structure; firm; few distinct clay films on faces of peds and lining pores; few fine prominent black (10YR 2/1) manganese masses in the matrix; common fine flakes of mica; very strongly acid; clear wavy boundary.

BC—46 to 72 inches; yellowish brown (10YR 5/8) silty clay; weak medium subangular blocky structure; firm; few distinct clay films on faces of peds and

lining pores; few fine prominent black (10YR 2/1) manganese masses in the matrix; common coarse prominent gray (10YR 6/1) iron depletions in the matrix; common fine flakes of mica; very strongly acid.

### Range in Characteristics

*Thickness of the solum:* 40 to 60 inches

*Depth to bedrock:* More than 60 inches

*Size and kind of rock fragments:* Pebbles and gravel of sandstone, quartzite, and chert

*Reaction:* Very strongly acid or strongly acid, except in limed areas

#### *Ap horizon:*

Hue—10YR

Value—4 or 5

Chroma—3 or 4

Texture—silt loam

Content of rock fragments—0 to 5 percent

#### *Bt and BC horizons:*

Hue—7.5YR to 2.5Y

Value—4 to 7

Chroma—3 to 8

Redoximorphic features—iron and manganese masses and nodules in shades of yellow, red, black, or brown; iron depletions in shades of gray with chroma of 2 or less occur in the upper 24 inches but not above the upper 10 inches

Texture—silty clay, clay, or clay loam

Content of rock fragments—0 to 5 percent

# Formation of the Soils

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This section describes the major factors and processes that have affected the formation and morphology of soils in the survey area. Soil genesis mainly consists of two major processes—the accumulation of parent materials and the differentiation of horizons in the profile (13). Essential concepts of soil genesis include: processes active in the soil today have been operating over time and have varying degrees of expression over space; many soil-forming (and soil-destroying) processes proceed simultaneously in a soil and the resulting profile reflects the balances of these processes; present and past distinctive regimes or combinations of processes produce distinctive soils; and five external factors of soil formation drive the internal pedogenic processes within a soil (3, 10).

## Factors of Soil Formation

The characteristics of a soil depend upon five soil-forming factors: climate, living organisms, parent material, relief, and time (3, 10). These factors are interrelated and interdependent. The “Physiography, Drainage, and Geology” section in the introduction gives additional information on the parent material and relief factors. The “Climate” section in the introduction gives detailed records about present-day temperature and precipitation trends. A few of the more important effects of the five soil-forming factors on the soils in the survey area are discussed in the following paragraphs.

## Parent Material

Parent material is the unconsolidated geologic material from which soils form. It plays a large role in the chemical properties of the soils. The soils in Rhea County formed in parent materials of three major origins—residuum, colluvium, and alluvium. Residuum is derived from the weathering of rocks and refers to material that formed in place. Colluvium is produced from material that has moved downslope by gravity. Alluvium refers to parent material that was moved and deposited by water.

Residuum is mostly on ridgetops and the more stable landscapes. In Rhea County, a variety of rocks are the source of residual parent materials. On the Cumberland Plateau, sandstone is the largest source of residuum. Shale and siltstone bedrock are also sources of residuum in this area. Lily soils formed in residuum from sandstone, and Gilpin soils formed in residuum from shale. In the Southern Appalachian Ridges and Valleys, limestone or dolomite bedrock that has varying amounts of chert is the largest source of residuum. Sandstone and shale residuum occur in the Southern Appalachian Ridges and Valleys but to a lesser extent than limestone and dolomite.

Colluvium generally occurs on footslopes and on the lower portions of very steep slopes. Some of the largest areas of colluvial parent material are located near the base of the Cumberland Escarpment. There are several areas having colluvial parent material on the lower parts of very steep slopes of the River Knobs and Muddy Creek Ridge. Examples of soils that formed in colluvium are Bouldin and Salacoa soils.

The largest areas of alluvium in the county are located adjacent to the Tennessee River and along major streams. Some of the alluvial materials on stream terraces have been stable for a considerable period of time while some of the alluvial deposits near active streams are generally younger and may still be accumulating from present-day flood events. Waynesboro, Holston, and Etowah soils are examples of soils that formed in the older alluvial deposits on stream terraces. Shady, Bloomingdale, Cobstone, and Cranmore soils are examples of soils that formed in relatively younger alluvial deposits on flood plains.

## Relief

The relief of the landscape influences soil formation through its effect on runoff, erosion, plant cover, soil temperature, soil drainage, and soil stability. In nearly level areas, water moves through the soil and surface runoff is minimal. In steep and

very steep areas, however, the surface runoff rates may exceed the infiltration rates. Relief also influences temperature by controlling the exposure and angle of the soil surface to sunlight. North and east exposures of the landscape tend to be more moist and cooler than south and west exposures. These factors influence the type and abundance of plants that grow on these landscapes. The ground cover helps to control the amount of shading or exposure of the soil to sunlight.

Relief, as related to steepness and length of slope, is a major factor when assessing the soil erosion potential. On sloping to very steep, unprotected soils, runoff carries away large amounts of valuable topsoil. Erosion can remove the topsoil much faster than topsoil can form if the erosion is unchecked. The soil material that it is removed by erosion is then carried to lower parts of the landscape. Some of the sediment is deposited on flood plains and becomes soil parent material. Most of the transported and suspended sediment reaches ditches, culverts, streams, and lakes where it must be removed or it becomes detrimental to the environment. Nationally, billions of taxpayer dollars are spent each year for the removal of sediment, improvement of water quality, and treatment of drinking water.

## Climate

Climate plays a large role in soil genesis. Temperature and moisture are equally important climatic factors. Temperature partly controls the rates of chemical reactions. Moisture, as precipitation, helps to transport material from one place to another through erosion. Water within the soil profile helps to move particles and components from one part of the soil profile to another and influences the type and rate of chemical reactions (3, 10). Moisture contributes to the physical weathering of parent materials by physically rupturing rocks and minerals when it freezes.

Climate is reflected in soil classification. Temperature regime is a part of the family classification, and moisture regime is normally reflected in the suborder classification (15, 16). The soils in the Southern Appalachian Ridges and Valleys area of Rhea County are in the thermic temperature regime. The soils in the Cumberland Mountains and Plateau area and the Cumberland Escarpment area are in the mesic temperature regime (32). The soils in Rhea County are in the udic or aquic moisture regime.

The "Climate" section in the introduction provides more information on the climate in the survey area.

## Living Organisms

Vegetation, bacteria, fungi, and animals actively affect soil formation. These elements may be most active in areas of grasslands or forests. Vegetation generally supplies organic matter, which, when decomposed, gives soil a dark color in the surface layer. It also transfers or cycles nutrients from the subsoil to the surface layer. Bacteria and fungi decompose the organic matter and release minerals into the soil. Worms, insects, and burrowing animals mix the soil and thus affect soil tilth, structure, and porosity.

Human activities, such as tillage and management practices, affect the physical and chemical properties of soils. The use of lime, fertilizer, insecticides, and herbicides alters the chemical makeup of the soil. The movement of vehicles contributes to soil compaction. Increased bulk density, a lower percent of porosity, increased runoff rates, and decreased infiltration rates are some of the effects of soil compaction.

## Time

Over time, the factors of climate, living organisms, relief, and parent material interact to form a soil. The soils of Rhea County range from relatively young to old. The soils that formed in residuum range from the relatively young Ramsey soils, which have hard bedrock at a depth of 7 to 20 inches, to the relatively old Dewey soils, which have bedrock at a depth of more than 60 inches. Depth to bedrock is only one soil property that is influenced by time.

In younger soils, soil horizons are poorly differentiated, soil structure is generally weaker, and soil colors are generally not as bright as in older soils. Relatively older soils normally have stronger soil structure, concentrations of illuvial clay in the subsoil, and brighter soil colors.

## Processes of Horizon Differentiation

The results of the soil-forming factors include the differentiation of horizons (or layers) in a soil profile. This complex process consists of additions, removals, transfers, and transformations within the soil system (13). The soil profile extends from the surface down to material that is little altered or unaltered by the soil-forming process.

Generally, soil horizons are formed by the accumulation of organic matter, the leaching of soluble constituents, the reduction and movement of

iron, the formation of soil structure, and the formation and translocation of clay minerals.

The accumulation and incorporation of organic material usually occurs when plant material accumulates on the soil surface or when organic material is added to the surface. These materials then decompose and are incorporated into the soil. Additions of organic matter darken the mineral material and help to make an A horizon.

In order for soils to have distinct subsoil horizons (B horizons), the subsoil generally needs to be leached of carbonates and more soluble minerals. The remaining minerals are weathered, and clay minerals, along with other minerals resulting from weathering processes, form. These clay minerals and

other minerals are then translocated from the upper soil horizons into the subsoil. Clay is usually translocated in soils by water moving through the soil profile.

Soil parent materials in the Cumberland Mountains and Plateau region are comprised mostly of silica minerals that are very resistant to weathering. Parent materials in the Southern Appalachian Ridges and Valleys generally have more weatherable minerals. In the Southern Appalachian Ridges and Valleys region, soils are generally deeper to bedrock, have better defined B horizons, and have a higher clay content than soils in the Cumberland Mountains and Plateau region.



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# Glossary

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**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvial fan.** The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Animal unit month (AUM).** The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

**Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay.

**Aspect.** The direction in which a slope faces.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low .....	0 to 2
Low .....	2 to 4
Moderate .....	4 to 6
High .....	more than 6

**Backslope.** The geomorphic component that forms the steepest inclined surface and principal

element of many hillsides. Backslopes in profile are commonly steep, are linear, and may or may not include cliff segments.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K) expressed as a percentage of the total cation-exchange capacity.

**Bedding planes.** Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bedrock-controlled topography.** A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

**Bisequum.** Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Breast height.** An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

**Brush management.** The use of mechanical, chemical, and/or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

**Cable yarding.** A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

**Canopy.** The leafy crown of trees or shrubs. (See Crown.)

**Capillary water.** Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

**Catena.** A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

**Channery soil material.** Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a chanter.

**Chemical treatment.** Control of unwanted vegetation through the use of chemicals.

**Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay depletions.** Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Coarse textured soil.** Sand or loamy sand.

**Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

**Cobbly soil material.** Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and

extremely cobbly soil material has more than 60 percent.

**Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

**Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

**Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

**Concretions.** Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

**Conservation cropping system.** Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

**Conservation tillage.** A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

**Consistence, soil.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

**Contour stripcropping.** Growing crops in strips that

follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Cropping system.** Growing crops according to a planned system of rotation and management practices.

**Crop residue management.** Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

**Cross-slope farming.** Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

**Crown.** The upper part of a tree or shrub, including the living branches and their foliage.

**Culmination of the mean annual increment (CMAI).** The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

**Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.

**Deferred grazing.** Postponing grazing or resting grazing land for a prescribed period.

**Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep soils, 20 to 40 inches; shallow soils, 10 to 20 inches; and very shallow soils, less than 10 inches.

**Depth to rock** (in tables). Bedrock is too near the surface for the specified use.

**Dip slope.** A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

**Diversion (or diversion terrace).** A ridge of earth,

generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class (natural).** Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

**Endosaturation.** A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

**Episaturation.** A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion (geologic).*—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion (accelerated).*—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

**Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

**Excess fines** (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

**Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is

tilled for at least one growing season for weed control and decomposition of plant residue.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called normal field capacity, normal moisture capacity, or capillary capacity.

**Fill slope.** A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

**Fine textured soil.** Sandy clay, silty clay, or clay.

**Firebreak.** An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

**First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.

**Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

**Footslope.** The inclined surface at the base of a hill.

**Forb.** Any herbaceous plant not a grass or a sedge.

**Forest cover.** All trees and other woody plants (underbrush) covering the ground in a forest.

**Forest type.** A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

**Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

**Green manure crop (agronomy).** A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

**Ground water.** Water filling all the unblocked pores of the material below the water table.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

**Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

**High-residue crops.** Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

**Hill.** A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or

lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr horizon.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

**Igneous rock.** Rock formed by solidification from a molten or partially molten state. Major varieties

include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Impervious soil.** A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2 .....	very low
0.2 to 0.4 .....	low
0.4 to 0.75 .....	moderately low
0.75 to 1.25 .....	moderate
1.25 to 1.75 .....	moderately high
1.75 to 2.5 .....	high
More than 2.5 .....	very high

**Intermittent stream.** A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

**Iron depletions.** Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

**Karst (topography).** The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

**Knoll.** A small, low, rounded hill rising above adjacent landforms.

**Landslide.** The rapid downhill movement of a mass of

soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

**Large stones** (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Low-residue crops.** Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

**Low strength.** The soil is not strong enough to support loads.

**Masses.** Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

**Mechanical treatment.** Use of mechanical equipment for seeding, brush management, and other management practices.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

**Metasedimentary rock.** Sedimentary rock, such as shale, siltstone, or sandstone, that has been slightly altered by metamorphic processes, such as heat and pressure. Such rocks retain much of their original appearance and physical properties but have altered mineralogical characteristics. Examples are metasandstone and arkose.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.

**Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.

**Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

**Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

**Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

**Nodules.** Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low .....	less than 0.5 percent
Low .....	0.5 to 1.0 percent
Moderately low .....	1.0 to 2.0 percent
Moderate .....	2.0 to 4.0 percent
High .....	4.0 to 8.0 percent
Very high .....	more than 8.0 percent

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, hardpan, fragipan, claypan, plowpan, and traffic pan.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Pebble.** A rounded or angular fragment of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. A collection of pebbles is referred to as gravel.

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The downward movement of water through the soil.

**Percolates slowly** (in tables). The slow movement of water through the soil adversely affects the specified use.

**Permeability.** The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as “saturated hydraulic conductivity,” which is defined in the “Soil Survey Manual.” In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as “permeability.” Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow .....	0.0 to 0.01 inch
Very slow .....	0.01 to 0.06 inch
Slow .....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid .....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Piping** (in tables). Formation of subsurface tunnels or pipe-like cavities by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plowpan.** A compacted layer formed in the soil directly below the plowed layer.

**Poorly graded.** Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Potential rooting depth (effective rooting depth).**

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Prescribed burning.** Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Proper grazing use.** Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid .....	less than 3.5
Extremely acid .....	3.5 to 4.4
Very strongly acid .....	4.5 to 5.0
Strongly acid .....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid .....	6.1 to 6.5
Neutral .....	6.6 to 7.3

Slightly alkaline .....	7.4 to 7.8
Moderately alkaline .....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

**Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

**Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

**Reduced matrix.** A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rill.** A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

**Road cut.** A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil

is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Sand.** As a soil separate, individual rock or mineral fragments ranging from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sandstone.** Sedimentary rock containing dominantly sand-sized particles.

**Saprolite.** Unconsolidated residual material underlying the soil and grading to hard bedrock below.

**Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

**Second bottom.** The first terrace above the normal flood plain (or first bottom) of a river.

**Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Seepage** (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

**Sequum.** A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

**Shrink-swell** (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silica.** A combination of silicon and oxygen. The mineral form is called quartz.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine

sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

**Sinkhole.** A depression in the landscape where limestone has been dissolved.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level .....	0 to 2 percent
Gently sloping .....	2 to 5 percent
Sloping .....	5 to 12 percent
Moderately steep .....	12 to 20 percent
Steep .....	20 to 30 percent
Very steep .....	30 percent and higher

**Slope (in tables).** Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

**Slow refill (in tables).** The slow filling of ponds, resulting from restricted permeability in the soil.

**Small stones (in tables).** Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soft bedrock.** Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand .....	2.0 to 1.0
Coarse sand .....	1.0 to 0.5
Medium sand .....	0.5 to 0.25
Fine sand .....	0.25 to 0.10
Very fine sand .....	0.10 to 0.05
Silt .....	0.05 to 0.002
Clay .....	less than 0.002

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.

**Stripcropping.** Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either single grain (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

**Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small

to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

**Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Thin layer** (in tables). Otherwise suitable soil material that is too thin for the specified use.

**Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Toeslope.** The outermost inclined surface at the base of a hill; part of a footslope.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily

rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

**Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Water bars.** Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

**Well graded.** Refers to soil material consisting of coarse-grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

**Wilting point (or permanent wilting point).** The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

**Windthrow.** The uprooting and tipping over of trees by the wind.

# Tables

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Table 1.--Temperature and Precipitation  
(Recorded in the period 1961-90 at Dayton, Tennessee)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snow- fall
				Maximum temp. higher than--	Minimum temp. lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
January--	46.9	26.7	36.8	68	-3	12	4.83	2.91	6.56	8	2.7
February--	52.5	29.8	41.1	75	5	29	4.83	2.70	6.71	7	1.6
March----	62.9	37.7	50.3	83	15	119	6.36	3.70	8.74	8	0.4
April----	72.8	45.1	59.0	89	25	284	4.54	2.61	6.26	7	0.1
May-----	79.6	53.3	66.5	91	34	509	5.18	3.13	7.01	8	0.0
June-----	86.4	61.0	73.7	97	45	712	3.63	1.90	5.15	6	0.0
July-----	88.8	65.0	76.9	99	45	825	4.74	2.67	6.57	8	0.0
August---	88.0	64.3	76.2	97	52	804	4.14	2.05	5.96	6	0.0
September	82.2	58.6	70.4	94	39	612	4.25	1.95	6.22	6	0.0
October--	72.2	46.2	59.2	86	27	297	3.39	1.72	5.07	4	0.0
November-	60.4	38.2	49.3	78	16	96	4.74	3.19	6.16	7	0.0
December-	50.3	30.5	40.4	71	5	27	5.67	2.80	8.17	7	0.9
Yearly: Average	70.2	46.4	58.3	---	---	---	---	---	---	---	---
Extreme	107	-15	---	100	-4	---	---	---	---	---	---
Total--	---	---	---	---	---	4,325	56.31	47.22	64.17	82	5.9

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.—Freeze Dates in Spring and Fall  
(Recorded in the period 1961-90 at Dayton, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 5	Apr. 15	Apr. 25
2 years in 10 later than--	Mar. 29	Apr. 10	Apr. 20
5 years in 10 later than--	Mar. 17	Mar. 31	Apr. 11
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 2	Oct. 21	Oct. 7
2 years in 10 earlier than--	Nov. 7	Oct. 26	Oct. 12
5 years in 10 earlier than--	Nov. 16	Nov. 6	Oct. 23

Table 3.—Growing Season  
(Recorded in the period 1961-90 at Dayton, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	222	199	173
8 years in 10	229	206	180
5 years in 10	243	218	193
2 years in 10	257	231	205
1 year in 10	264	236	212

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
Ac	Allegheny-Cotaco complex, occasionally flooded-----	439	0.2
AeB	Allen loam, 2 to 5 percent slopes-----	81	*
AeC	Allen loam, 5 to 12 percent slopes-----	2,087	1.0
AeD	Allen loam, 12 to 25 percent slopes-----	2,279	1.1
AMC	Allen-Urban land complex, 2 to 12 percent slopes-----	188	*
AnB	Altavista loam, 1 to 5 percent slopes-----	771	0.4
AsF	Apison-Sunlight-Salacoa complex, 25 to 65 percent slopes-----	4,381	2.0
At	Atkins loam, frequently flooded-----	270	0.1
BaE	Barfield-Rock outcrop complex, 10 to 40 percent slopes-----	849	0.4
BEF	Bethesda-Mine pits complex, 10 to 80 percent slopes-----	32	*
Bm	Bloomingtondale silty clay loam, frequently flooded-----	1,335	0.6
CaB	Capshaw silt loam, 2 to 5 percent slopes-----	2,312	1.1
CaC	Capshaw silt loam, 5 to 12 percent slopes-----	217	0.1
Cb	Cobstone cobbly fine sandy loam, 0 to 3 percent slopes, rarely flooded-----	1,018	0.5
CDB	Cobstone-Shady-Urban land complex, 0 to 5 percent slopes, rarely flooded-----	1,022	0.5
CeC	Colbert and Lyerly soils, 2 to 12 percent slopes, very rocky-----	5,087	2.4
CgC	Collegedale silt loam, 2 to 12 percent slopes-----	1,055	0.5
CgD	Collegedale silt loam, 12 to 25 percent slopes-----	393	0.2
CoC	Conasauga silt loam, 5 to 12 percent slopes-----	576	0.3
Cr	Cranmore loam, 0 to 2 percent slopes, frequently flooded-----	295	0.1
DeB	Dewey silt loam, 2 to 5 percent slopes-----	134	*
DeC	Dewey silt loam, 5 to 12 percent slopes-----	813	0.4
DeD	Dewey silt loam, 12 to 25 percent slopes-----	407	0.2
DL	Dumps, landfills-----	51	*
Ec	Ealy-Craigsville complex, occasionally flooded-----	789	0.4
Eg	Egam silty clay loam, 0 to 3 percent slopes-----	481	0.2
EtB	Etowah loam, 2 to 5 percent slopes-----	1,399	0.6
EtC	Etowah loam, 5 to 12 percent slopes-----	745	0.3
FuB	Fullerton gravelly silt loam, 2 to 5 percent slopes-----	101	*
FuC	Fullerton gravelly silt loam, 5 to 12 percent slopes-----	5,040	2.3
FuD	Fullerton gravelly silt loam, 12 to 25 percent slopes-----	4,573	2.1
FuF	Fullerton gravelly silt loam, 25 to 60 percent slopes-----	2,544	1.2
GpC	Gilpin loam, 5 to 12 percent slopes-----	1,646	0.8
GpD	Gilpin loam, 12 to 20 percent slopes-----	2,875	1.3
GpF	Gilpin loam, 20 to 60 percent slopes-----	7,060	3.3
GuF	Gilpin-Bouldin-Petros complex, 25 to 80 percent slopes, very stony---	9,250	4.3
Ha	Hamblen silt loam, occasionally flooded-----	3,584	1.7
HoB	Holston loam, 2 to 5 percent slopes-----	1,217	0.6
HoC	Holston loam, 5 to 12 percent slopes-----	639	0.3
JeC	Jefferson cobbly loam, 5 to 12 percent slopes-----	234	0.1
JsD	Jefferson-Shelocta complex, 10 to 20 percent slopes-----	436	0.2
JsF	Jefferson-Shelocta complex, 20 to 45 percent slopes-----	140	*
JvD	Jefferson-Varilla-Shelocta complex, 10 to 20 percent slopes, very stony-----	459	0.2
JvF	Jefferson-Varilla-Shelocta complex, 20 to 60 percent slopes, very stony-----	3,636	1.7
Kt	Ketona-Tupelo complex, 0 to 3 percent slopes, frequently flooded----	1,621	0.8
LhB	Lily loam, 2 to 5 percent slopes-----	3,598	1.7
LhC	Lily loam, 5 to 12 percent slopes-----	25,368	11.8
LhD	Lily loam, 12 to 20 percent slopes-----	14,755	6.8
LhE	Lily loam, 20 to 35 percent slopes-----	5,068	2.4
LnB	Lonewood-Hendon complex, 2 to 5 percent slopes-----	890	0.4
LnC	Lonewood-Hendon complex, 5 to 12 percent slopes-----	3,277	1.5
PaC	Pailo gravelly silt loam, 5 to 12 percent slopes-----	9,112	4.2
PaD	Pailo gravelly silt loam, 12 to 25 percent slopes-----	9,132	4.2
PaF	Pailo gravelly silt loam, 25 to 60 percent slopes-----	5,943	2.8
PCF	Pits, clay, 10 to 80 percent slopes-----	56	*
PM	Pits, mine, and dumps-----	36	*
Pp	Pope and Philo loams, frequently flooded-----	498	0.2

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
RaC	Ramsey loam, 5 to 12 percent slopes, very rocky-----	984	0.5
RrD	Ramsey-Rock outcrop complex, 12 to 20 percent slopes-----	2,613	1.2
RrF	Ramsey-Rock outcrop complex, 20 to 50 percent slopes-----	6,273	2.9
SaC	Salacoa loam, 5 to 12 percent slopes-----	964	0.4
SgE	Sequoia-Gilpin complex, 20 to 35 percent slopes-----	716	0.3
ShB	Shady loam, 1 to 5 percent slopes-----	1,851	0.9
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded-----	1,403	0.7
St	Staser loam, 0 to 3 percent slopes-----	821	0.4
TaD	Talbott-Rock outcrop complex, 5 to 25 percent slopes-----	753	0.3
TmB	Tasso-Minvale complex, 2 to 5 percent slopes-----	1,490	0.7
TmC	Tasso-Minvale complex, 5 to 12 percent slopes-----	3,587	1.7
TmD	Tasso-Minvale complex, 12 to 25 percent slopes-----	236	0.1
TsC	Townley-Sunlight complex, 5 to 12 percent slopes-----	4,263	2.0
TsD	Townley-Sunlight complex, 12 to 25 percent slopes-----	3,997	1.9
UUC	Urban land-Udorthents complex, 2 to 12 percent slopes-----	2,122	1.0
W	Water-----	17,900	8.3
Wa	Wax-Rockdell complex, 0 to 3 percent slopes, occasionally flooded---	2,788	1.3
WbB2	Waynesboro loam, 2 to 5 percent slopes, eroded-----	1,587	0.7
WbC2	Waynesboro loam, 5 to 12 percent slopes, eroded-----	5,768	2.7
WbD2	Waynesboro loam, 12 to 25 percent slopes, eroded-----	2,054	1.0
WfB	Wolftever silt loam, 2 to 5 percent slopes-----	1,136	0.5
	Total-----	215,600	100.0

\* Less than 0.1 percent.

Table 5.—Relationship Between Residue Cover and Erosion Control

Residue cover (percent on any day)	Erosion reduction (percent while residue is present)
10	30
20	50
30	65
40	75
50	83
60	88
70	91
80	94

Table 6.—Grazing Efficiencies

(Note: Grazing efficiency percentages can vary widely and should be used only as a guide)

Number of paddocks	Days on each paddock	Grazing efficiency (percent)
Continuous	12 or more	30-35
4	9	35-45
5	7	50-60
8	4	60-65
16	2	60-65
Hayland	---	70 (high cost)

Table 7.—The Maintenance of Forages in a Vegetative State

Forage species	Height to begin grazing	Height to terminate grazing
Tall fescue, orchardgrass, annual ryegrass, sericea lespedeza	5 to 8 inches	3 inches
Bermudagrass	5 to 8 inches	2 inches
Native warm-season grasses, johnsongrass, sudangrass	18 inches	8 to 10 inches

Table 8.—Land Capability and Yields Per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for nonirrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. AUM represents animal unit month)

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Grass-legume pasture	Soybeans	Wheat
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Bu</u>
Ac:						
Allegheny-----	2w	100.00	3.20	8.00	---	---
Cotaco-----	2w	100.00	3.00	7.50	---	---
AeB:						
Allen-----	2e	90.00	3.20	8.00	36.00	54.00
AeC:						
Allen-----	3e	80.00	3.20	8.00	32.00	52.00
AeD:						
Allen-----	4e	70.00	2.80	7.00	28.00	48.00
AMC.						
Allen-Urban land						
AnB:						
Altavista-----	2e	115.00	3.20	8.00	38.00	55.00
AsF:						
Apison-Sunlight-Salacoa-	7s	---	---	---	---	---
At:						
Atkins-----	3w	---	---	7.00	---	---
BaE:						
Barfield-Rock outcrop---	7s	---	---	---	---	---
BEF:						
Bethesda-Mine pits-----	7s	---	---	---	---	---
Bm:						
Bloomingdale-----	3w	---	---	7.00	---	---
CaB:						
Capshaw-----	2e	70.00	2.50	7.00	28.00	43.00
CaC:						
Capshaw-----	3e	60.00	2.50	7.00	24.00	40.00
Cb:						
Cobstone-----	6s	70.00	2.20	5.50	---	---
CDB.						
Cobstone-Shady-Urban land						
CeC:						
Colbert-----	4s	60.00	2.60	6.50	---	---
Lyerly-----	4s	50.00	2.40	6.00	---	---

Table 8.—Land Capability and Yields Per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Grass-legume pasture	Soybeans	Wheat
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Bu</u>
CgC: Collegedale-----	4e	70.00	2.40	6.00	---	48.00
CgD: Collegedale-----	6e	---	2.00	5.00	---	---
CoC: Conasauga-----	6e	---	2.20	5.50	---	---
Cr: Cranmore-----	3w	---	---	6.00	---	---
DeB: Dewey-----	2e	105.00	3.40	8.50	35.00	55.00
DeC: Dewey-----	3e	90.00	3.20	8.00	30.00	50.00
DeD: Dewey-----	4e	85.00	2.80	7.10	28.00	45.00
DL. Dumps, landfills						
Ec: Ealy-----	3s	90.00	2.80	7.00	---	---
Craigsville-----	3s	70.00	2.60	6.50	---	---
Eg: Egam-----	1	100.00	3.00	7.00	35.00	45.00
EtB: Etowah-----	2e	110.00	3.40	8.50	35.00	55.00
EtC: Etowah-----	3e	95.00	3.20	8.00	32.00	55.00
FuB: Fullerton-----	2e	80.00	3.00	7.50	30.00	45.00
FuC: Fullerton-----	3e	70.00	2.60	6.50	26.00	40.00
FuD: Fullerton-----	4e	65.00	2.20	5.50	25.00	35.00
FuF: Fullerton-----	7e	---	---	---	---	---
GpC: Gilpin-----	3e	85.00	2.40	6.00	30.00	35.00
GpD: Gilpin-----	4e	80.00	2.20	5.50	25.00	30.00
GpF: Gilpin-----	7e	---	---	---	---	---

Table 8.—Land Capability and Yields Per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Grass-legume pasture	Soybeans	Wheat
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Bu</u>
GuF: Gilpin-Bouldin-Petros---	7s	---	---	---	---	---
Ha: Hamblen-----	2w	95.00	3.00	7.50	38.00	---
HoB: Holston-----	2e	100.00	3.20	8.00	35.00	55.00
HoC: Holston-----	3e	85.00	2.80	7.00	25.00	45.00
JeC: Jefferson-----	4s	75.00	2.20	6.00	---	---
JsD: Jefferson-Shelocta-----	6s	---	2.20	5.50	---	---
JsF: Jefferson-Shelocta-----	7s	---	---	---	---	---
JvD: Jefferson-----	6s	---	2.20	5.50	---	---
Varilla-----	6s	---	---	---	---	---
Shelocta-----	6s	---	2.20	5.50	---	---
JvF: Jefferson-Varilla- Shelocta-----	7s	---	---	---	---	---
Kt: Ketona-----	4w	50.00	2.40	6.00	25.00	---
Tupelo-----	4w	60.00	2.80	7.00	35.00	---
LhB: Lily-----	2e	95.00	3.00	7.50	35.00	40.00
LhC: Lily-----	3e	85.00	2.80	7.00	30.00	35.00
LhD: Lily-----	4e	70.00	2.60	6.50	25.00	30.00
LhE: Lily-----	6e	---	---	---	---	---
LnB: Lonewood-----	2e	100.00	3.20	8.00	38.00	50.00
Hendon-----	2e	105.00	3.00	8.00	38.00	50.00
LnC: Lonewood-----	3e	90.00	2.80	7.00	35.00	48.00
Hendon-----	3e	95.00	2.80	7.00	35.00	45.00

Table 8.—Land Capability and Yields Per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Grass-legume pasture	Soybeans	Wheat
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Bu</u>
PaC: Pailo-----	4s	72.00	1.80	4.50	26.00	38.00
PaD: Pailo-----	6s	---	1.50	3.80	---	---
PaF: Pailo-----	7s	---	---	---	---	---
PCF. Pits, clay						
PM. Pits, mine, and dumps						
Pp: Pope and Philo-----	2w	100.00	3.00	7.50	---	---
RaC: Ramsey-----	6s	---	1.40	3.50	---	---
RrD: Ramsey-Rock outcrop----	6s	---	1.40	3.50	---	---
RrF: Ramsey-Rock outcrop----	7s	---	---	---	---	---
SaC: Salacoa-----	3e	95.00	3.00	7.50	31.00	45.00
SgE: Sequoia-----	6e	---	---	5.00	---	---
Gilpin-----	6e	---	---	5.00	---	---
ShB: Shady-----	2e	120.00	3.20	8.00	40.00	60.00
Sm: Shady-----	2w	120.00	3.20	8.00	44.00	---
St: Staser-----	1	120.00	3.40	8.50	40.00	60.00
TaD: Talbot-Rock outcrop----	6s	---	---	5.00	---	---
TmB: Tasso-----	2e	90.00	3.00	7.50	32.00	45.00
Minvale-----	2e	100.00	3.20	8.00	32.00	45.00
TmC: Tasso-----	3e	80.00	2.80	7.00	27.00	40.00
Minvale-----	3e	90.00	2.80	7.00	30.00	50.00

Table 8.—Land Capability and Yields Per Acre of Crops and Pasture—Continued

Map symbol and soil name	Land capability	Corn	Grass-legume hay	Grass-legume pasture	Soybeans	Wheat
		<u>Bu</u>	<u>Tons</u>	<u>AUM</u>	<u>Bu</u>	<u>Bu</u>
TmD:						
Tasso-----	4e	75.00	2.60	6.50	---	---
Minvale-----	4e	80.00	2.80	7.00	---	---
TsC:						
Townley-----	6e	---	---	5.30	24.00	35.00
Sunlight-----	6e	---	---	5.00	---	---
TsD:						
Townley-----	7e	---	---	4.50	---	---
Sunlight-----	7e	---	---	4.30	---	---
UUC. Urban land-Udorthents						
W. Water						
Wa:						
Wax-----	3w	65.00	2.40	6.00	30.00	---
Rockdell-----	3w	65.00	2.60	6.60	20.00	---
WbB2:						
Waynesboro-----	2e	90.00	3.20	8.10	35.00	50.00
WbC2:						
Waynesboro-----	3e	80.00	3.00	7.60	28.00	40.00
WbD2:						
Waynesboro-----	4e	85.00	2.80	7.00	---	---
WfB:						
Wolftever-----	2e	75.00	2.80	7.00	30.00	40.00

Table 9.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
Ac	Allegheny-Cotaco complex, occasionally flooded
AeB	Allen loam, 2 to 5 percent slopes
AnB	Altivista loam, 1 to 5 percent slopes
CaB	Capshaw silt loam, 2 to 5 percent slopes
DeB	Dewey silt loam, 2 to 5 percent slopes
Eg	Egam silty clay loam, 0 to 3 percent slopes
EtB	Etowah loam, 2 to 5 percent slopes
FuB	Fullerton gravelly silt loam, 2 to 5 percent slopes
Ha	Hamblen silt loam, occasionally flooded
HoB	Holston loam, 2 to 5 percent slopes
LhB	Lily loam, 2 to 5 percent slopes
LnB	Lonewood-Hendon complex, 2 to 5 percent slopes
Pp	Pope and Philo loams, frequently flooded (if protected from flooding or not frequently flooded during the growing season)
ShB	Shady loam, 1 to 5 percent slopes
Sm	Shady loam, 0 to 3 percent slopes, occasionally flooded
St	Staser loam, 0 to 3 percent slopes
TmB	Tasso-Minvale complex, 2 to 5 percent slopes
WbB2	Waynesboro loam, 2 to 5 percent slopes, eroded
WfB	Wolftever silt loam, 2 to 5 percent slopes

Table 10.--Woodland Management and Productivity

(Absence of an entry indicated that the component generally is not used for woodland)

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Suggested trees to plant
Ae: Allegheny-----	Slight	Slight	Slight	Slight	Severe	white oak----- Virginia pine----- black cherry----- black oak----- shortleaf pine----- hickory----- northern red oak----- yellow-poplar-----	70 72 --- 78 80 --- 93	black walnut, eastern white pine, loblolly pine, shortleaf pine, white oak, yellow-poplar
Cotaco-----	Slight	Slight	Slight	Slight	Severe	black oak----- sweet birch----- sweetgum----- white oak----- yellow-poplar-----	87 --- --- --- 95	eastern white pine, shortleaf pine, loblolly pine, white oak, yellow- poplar
AeB, AeC: Allen-----	Slight	Slight	Slight	Slight	Severe	shortleaf pine----- yellow-poplar-----	72 87	loblolly pine, shortleaf pine, yellow-poplar
AeD: Allen-----	Moderate	Moderate	Slight	Slight	Severe	shortleaf pine----- yellow-poplar-----	72 87	loblolly pine, shortleaf pine, yellow-poplar
AMC. Allen-Urban land								
AnB: Altavista-----	Slight	Slight	Slight	Slight	Moderate	American beech----- loblolly pine----- southern red oak----- sweetgum----- white oak----- yellow-poplar-----	--- 91 --- --- 77 ---	loblolly pine, eastern white pine, yellow-poplar, white oak
AsF: Apison-----	Severe	Severe	Slight	Moderate	Moderate	Virginia pine----- loblolly pine----- northern red oak----- shortleaf pine----- yellow-poplar-----	70 80 70 70 90	loblolly pine, shortleaf pine

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Suggested trees to plant
ASF: Sunlight-----	Severe	Severe	Moderate	Severe	Slight	Virginia pine----- chestnut oak loblolly pine----- shortleaf pine-----	60 --- 70 60	Virginia pine, loblolly pine
Salacoa-----	Severe	Severe	Slight	Slight	Severe	eastern white pine-- loblolly pine----- northern red oak---- yellow-poplar-----	80 80 70 90	eastern white pine, loblolly pine, shortleaf pine, yellow-poplar
At: Atkins-----	Slight	Severe	Severe	Moderate	Severe	American sycamore--- loblolly pine----- red maple----- sweetgum-----	--- 83 --- 95	eastern white pine, pin oak, sweetgum
BAE: Barfield-----	Severe	Severe	Moderate	Severe	Moderate	eastern redcedar----	35	Virginia pine, eastern redcedar
Rock outcrop.								
BEF: Bethesda-----	Severe	Severe	Severe	Slight	Moderate	Virginia pine----- black locust----- southern red oak----	60 75 65	Virginia pine, black locust, eastern redcedar
Mine pits.								
Bm: Bloomingdale-----	Slight	Severe	Severe	Moderate	Severe	sweetgum----- water oak-----	80 80	American sycamore, sweetgum
CaB, CaC: Capshaw-----	Slight	Slight	Slight	Slight	Moderate	loblolly pine----- northern red oak---- yellow-poplar-----	80 70 90	loblolly pine, shortleaf pine, yellow-poplar
Cb: Cobstone-----	Slight	Slight	Moderate	Slight	Moderate	Virginia pine----- shortleaf pine----- southern red oak----	70 70 70	loblolly pine, shortleaf pine
CDB. Cobstone-Shady-Urban land								

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Suggested trees to plant
CeC: Colbert-----	Slight	Slight	Slight	Slight	Moderate	eastern redcedar----- loblolly pine----- shortleaf pine-----	45 65 60	loblolly pine, shortleaf pine
lyerly-----	Slight	Slight	Moderate	Moderate	Moderate	eastern redcedar----- loblolly pine----- shortleaf pine-----	47 65 60	loblolly pine, shortleaf pine
CgC: Collegedale-----	Slight	Slight	Slight	Slight	Moderate	Virginia pine----- loblolly pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 80 70 70 70 90	Virginia pine, loblolly pine, shortleaf pine, yellow-poplar
CgD: Collegedale-----	Moderate	Moderate	Slight	Slight	Moderate	Virginia pine----- loblolly pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 80 70 70 70 90	Virginia pine, loblolly pine, shortleaf pine, yellow-poplar
COC: Conasauga-----	Moderate	Slight	Slight	Moderate	Moderate	Virginia pine----- eastern redcedar----- loblolly pine----- shortleaf pine----- American sycamore----- green ash----- American beech----- black cherry-----	71 50 72 71 --- --- --- ---	Virginia pine, loblolly pine, shortleaf pine, yellow-poplar
Cr: Cranmore-----	Slight	Severe	Moderate	Moderate	Severe	American sycamore----- willow oak----- green ash----- pin oak----- red maple----- swamp white oak-----	--- --- --- 90 --- ---	American sycamore, green ash, pin oak, red maple, swamp white oak, sweetgum

Table 10.--Woodland Management and Productivity-Continued

Map symbol and soil name	Management concerns					Potential productivity		Suggested trees to plant
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	
DeB, Dec: Dewey-----	Slight	Slight	Slight	Slight	Moderate	Virginia pine----- loblolly pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 78 73 70 70 90	black walnut, eastern white pine, loblolly pine, yellow- poplar
DeD: Dewey-----	Moderate	Moderate	Slight	Slight	Moderate	Virginia pine----- loblolly pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 78 73 70 70 90	black walnut, eastern white pine, loblolly pine, yellow- poplar
DL. Dumps, landfills								
Ec: Ealy-----	Slight	Slight	Moderate	Slight	Severe	American sycamore--- Virginia pine----- eastern white pine--- northern red oak--- eastern hemlock----- yellow-poplar-----	90 75 90 80 --- 105	black walnut, eastern white pine, loblolly pine, yellow- poplar
Craigsville-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- eastern white pine--- northern red oak--- yellow-poplar----- eastern hemlock-----	80 90 80 95	eastern white pine, loblolly pine, yellow-poplar
Eg: Egam-----	Slight	Slight	Moderate	Slight	Severe	loblolly pine----- southern red oak--- water oak----- yellow-poplar-----	90 80 90 100	black walnut, loblolly pine, yellow-poplar
EtB, EtC: Etowah-----	Slight	Slight	Slight	Slight	Severe	loblolly pine----- shortleaf pine----- southern red oak--- yellow-poplar-----	90 80 80 90	black walnut, loblolly pine, white oak, yellow- poplar, eastern white pine

Table 10.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		Suggested trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
FuB, FuC: Fullerton-----	Slight	Slight	Slight	Slight	Moderate	chestnut oak----- loblolly pine----- shortleaf pine----- southern red oak----- yellow-poplar-----	--- 80 67 70 90	eastern white pine, loblolly pine, southern red oak, yellow-poplar
FuD: Fullerton-----	Moderate	Moderate	Moderate	Slight	Moderate	chestnut oak----- loblolly pine----- shortleaf pine----- southern red oak----- yellow-poplar-----	--- 80 67 70 90	eastern white pine, loblolly pine, southern red oak, yellow-poplar
FuF: Fullerton-----	Severe	Severe	Moderate	Slight	Moderate	chestnut oak----- loblolly pine----- shortleaf pine----- southern red oak----- yellow-poplar-----	--- 80 67 70 90	eastern white pine, loblolly pine, southern red oak, yellow-poplar
GpC: Gilpin-----	Slight	Slight	Slight	Slight	Moderate	northern red oak----- yellow-poplar-----	80 90	loblolly pine, Virginia pine, eastern white pine, shortleaf pine
GpD: Gilpin-----	Moderate	Moderate	Moderate	Slight	Moderate	northern red oak----- yellow-poplar-----	80 90	loblolly pine, Virginia pine, eastern white pine, shortleaf pine
GpF: Gilpin-----	Severe	Severe	Moderate	Slight	Moderate	northern red oak----- yellow-poplar-----	80 90	loblolly pine, Virginia pine, eastern white pine, shortleaf pine

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity	
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index
GuF: Gilpin-----	Severe	Severe	Moderate	Slight	Moderate	northern red oak----- yellow-poplar-----	80 90 loblolly pine, Virginia pine, eastern white pine, shortleaf pine
Bouldin-----	Severe	Severe	Moderate	Slight	Moderate	northern red oak----- shortleaf pine----- yellow-poplar-----	75 70 90 shortleaf pine, loblolly pine, eastern white pine, yellow- poplar
Petros-----	Severe	Severe	Moderate	Severe	Slight	Virginia pine----- black oak----- loblolly pine----- southern red oak----	60 60 70 60 Virginia pine, loblolly pine, shortleaf pine
Ha: Hamblen-----	Slight	Slight	Slight	Slight	Severe	loblolly pine----- northern red oak----- yellow-poplar-----	90 80 100 loblolly pine, yellow-poplar, eastern white pine
HoB, HoC: Holston-----	Slight	Slight	Slight	Slight	Severe	northern red oak----- shortleaf pine----- yellow-poplar-----	78 69 86 loblolly pine, yellow-poplar, eastern white pine
Jec: Jefferson-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- shortleaf pine----- white oak----- yellow-poplar-----	70 70 70 90 eastern white pine, shortleaf pine, white oak, yellow- poplar
JSD: Jefferson-----	Moderate	Moderate	Moderate	Slight	Severe	Virginia pine----- scarlet oak----- shortleaf pine----- yellow-poplar-----	70 70 65 90 eastern white pine, northern red oak, shortleaf pine, white oak, yellow- poplar
Shelocta-----	Moderate	Moderate	Moderate	Slight	Severe	black oak----- scarlet oak----- white oak----- yellow-poplar-----	80 80 70 100 eastern white pine, northern red oak, shortleaf pine, white oak

Table 10.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity	
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index
JsF: Jefferson-----	Moderate	Moderate	Moderate	Slight	Severe	Virginia pine----- scarlet oak----- shortleaf pine----- yellow-poplar-----	70 70 65 90
							eastern white pine, northern red oak, shortleaf pine, white oak, yellow- poplar
Shelocta-----	Moderate	Moderate	Moderate	Slight	Severe	black oak----- scarlet oak----- white oak----- yellow-poplar-----	80 80 70 100
							eastern white pine, northern red oak, shortleaf pine, white oak, yellow- poplar
JvD: Jefferson-----	Moderate	Moderate	Moderate	Slight	Severe	northern red oak---- yellow-poplar-----	80 95
							eastern white pine, shortleaf pine, white oak, yellow- poplar
Varilla-----	Moderate	Moderate	Moderate	Slight	Moderate	white oak----- yellow-poplar-----	75 95
							eastern white pine, shortleaf pine, white oak, yellow- poplar
Shelocta-----	Moderate	Moderate	Moderate	Slight	Severe	scarlet oak----- shortleaf pine----- white oak----- yellow-poplar-----	80 129 77 100
							black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow- poplar
JvF: Jefferson-----	Severe	Severe	Moderate	Slight	Severe	northern red oak---- yellow-poplar-----	80 95
							eastern white pine, shortleaf pine, white oak, yellow- poplar
Varilla-----	Severe	Severe	Moderate	Slight	Moderate	white oak----- yellow-poplar-----	75 95
							eastern white pine, shortleaf pine, white oak, yellow- poplar

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns				Potential productivity	
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees
JvF: Shelocta-----	Severe	Severe	Moderate	Slight	Severe	scarlet oak----- shortleaf pine----- white oak----- yellow-poplar-----
						80 129 77 100
						black walnut, eastern white pine, northern red oak, shortleaf pine, white ash, white oak, yellow- poplar
Kt: Ketona-----	Slight	Severe	Moderate	Moderate	Severe	loblolly pine----- sweetgum----- water oak-----
						80 80 80
						loblolly pine, sweetgum, water oak
Tupelo-----	Slight	Moderate	Moderate	Slight	Severe	loblolly pine----- southern red oak----- sweetgum----- white oak----- yellow-poplar-----
						80 70 80 70 90
						American sycamore, eastern cottonwood, loblolly pine, willow oak
LhB, LhC: Lily-----	Slight	Slight	Slight	Slight	Moderate	Virginia pine----- black oak----- chestnut oak----- northern red oak----- scarlet oak----- shortleaf pine----- white oak-----
						80 78 73 78 77 63 73
						eastern white pine, northern red oak, shortleaf pine, white oak
LhD, LhE: Lily-----	Moderate	Moderate	Moderate	Slight	Moderate	Virginia pine----- scarlet oak----- shortleaf pine----- white oak----- yellow-poplar-----
						71 66 57 67 88
						shortleaf pine, white oak
LnB, LnC: Lonewood-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- eastern white pine----- loblolly pine----- shortleaf pine----- white oak-----
						70 80 80 70 70
						eastern white, pine, loblolly pine, shortleaf pine
Hendon-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- loblolly pine----- shortleaf pine----- southern red oak----- white oak-----
						70 80 70 70 70
						eastern white, pine, loblolly pine, shortleaf pine

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity		Suggested trees to plant
	Erosion hazard	Equip-ment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	
PaC: Pailo-----	Slight	Slight	Moderate	Slight	Moderate	chestnut oak----- loblolly pine----- red maple----- shortleaf pine----- southern red oak----	--- --- --- 70 70	loblolly pine, shortleaf pine, Virginia pine
PaD: Pailo-----	Moderate	Moderate	Moderate	Slight	Moderate	chestnut oak----- loblolly pine----- red maple----- shortleaf pine----- southern red oak----	--- --- --- 70 70	loblolly pine, shortleaf pine, Virginia pine
PaF: Pailo-----	Severe	Severe	Moderate	Slight	Moderate	chestnut oak----- loblolly pine----- red maple----- shortleaf pine----- southern red oak----	--- --- --- 70 70	loblolly pine, shortleaf pine, Virginia pine
PCF. Pits, clay								
PM. Pits, mine, and dumps								
Pp: Pope-----	Slight	Slight	Slight	Slight	Severe	American sycamore--- American beech----- bitternut hickory--- eastern hemlock----- northern red oak----- white oak----- yellow-poplar-----	--- --- --- --- --- 80 96	black walnut, eastern white pine, northern red oak, white oak, yellow-poplar
Philo-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- black oak----- northern red oak----- white ash----- white oak----- yellow-poplar-----	74 85 86 85 85 102	eastern white pine, yellow-poplar

Table 10.—Woodland Management and Productivity—Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Suggested trees to plant
RaC: Ramsey-----	Slight	Slight	Moderate	Severe	Slight	eastern white pine-- chestnut oak----- Virginia pine----- white oak-----	70 50 50 61	Virginia pine, loblolly pine, shortleaf pine
RrD: Ramsey-----	Moderate	Moderate	Moderate	Severe	Slight	eastern white pine-- chestnut oak----- Virginia pine----- white oak-----	70 50 50 61	Virginia pine, loblolly pine, shortleaf pine
Rock outcrop.								
RrF: Ramsey-----	Moderate	Severe	Severe	Severe	Slight	Virginia pine----- northern red oak--- shortleaf pine-----	50 50 50	Virginia pine, eastern white pine, loblolly pine, shortleaf pine
Rock outcrop.								
SaC: Salacoa-----	Slight	Slight	Slight	Slight	Moderate	eastern white pine-- loblolly pine----- northern red oak--- yellow-poplar-----	80 90 80 100	eastern white pine, loblolly pine, shortleaf pine, yellow-poplar
SgE: Sequoia-----	Moderate	Moderate	Slight	Slight	Moderate	Virginia pine----- loblolly pine----- northern red oak--- shortleaf pine-----	71 83 70 63	Virginia pine, loblolly pine, shortleaf pine
Gilpin-----	Severe	Severe	Slight	Slight	Moderate	northern red oak--- yellow-poplar-----	80 90	Virginia pine, black cherry, eastern white pine, yellow- poplar

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip-ment limitation	Seedling mortality	Wind-throw hazard	Plant competi-tion	Common trees	Site index	Suggested trees to plant
ShB: Shady-----	Slight	Slight	Slight	Slight	Moderate	hickory----- southern red oak----- white oak----- yellow-poplar-----	--- 80 80 100	black walnut, yellow-poplar, loblolly pine, loblolly pine, eastern white pine
Sm: Shady-----	Slight	Slight	Slight	Slight	Moderate	hickory----- northern red oak----- southern red oak----- white oak----- yellow-poplar-----	--- 80 80 80 100	black walnut, loblolly pine, yellow-poplar, yellow-poplar, eastern white pine
St: Staser-----	Slight	Slight	Slight	Slight	Severe	black walnut----- loblolly pine----- white oak----- yellow-poplar-----	--- 90 80 100	black walnut, loblolly pine, yellow-poplar
TaD: Talbott-----	Slight	Slight	Slight	Slight	Moderate	eastern redcedar----- loblolly pine----- northern red oak----- shortleaf pine-----	46 80 65 64	Virginia pine, eastern redcedar, loblolly pine, shortleaf pine
Rock outcrop. TmB, TmC: Tasso-----	Slight	Slight	Slight	Slight	Moderate	Virginia pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 70 70 70 90	Virginia pine, loblolly pine, shortleaf pine, eastern white pine
Minvale-----	Slight	Slight	Slight	Slight	Severe	Virginia pine----- loblolly pine----- shortleaf pine----- white oak----- yellow-poplar-----	70 80 70 70 90	black walnut, loblolly pine, yellow-poplar, yellow-poplar, eastern white pine
TmD: Tasso-----	Moderate	Moderate	Slight	Slight	Moderate	Virginia pine----- shortleaf pine----- southern red oak----- white oak----- yellow-poplar-----	70 70 70 70 90	Virginia pine, loblolly pine, shortleaf pine, shortleaf pine, eastern white pine

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity	
	Erosion hazard	Equip-ment limitation	Seedling mortality	Wind-throw hazard	Plant competi-tion	Common trees	Site index
TmD: Minvale-----	Moderate	Moderate	Slight	Slight	Severe	Virginia pine----- loblolly pine----- shortleaf pine----- white oak----- yellow-poplar-----	70 80 70 70 90
							black walnut, loblolly pine, yellow-poplar, eastern white pine
TSC: Townley-----	Slight	Slight	Slight	Moderate	Moderate	Virginia pine----- loblolly pine----- shortleaf pine-----	70 70 60
							Virginia pine, loblolly pine
Sunlight-----	Slight	Slight	Moderate	Severe	Slight	Virginia pine----- chestnut oak----- loblolly pine----- shortleaf pine-----	60 50 70 60
							Virginia pine, loblolly pine
TSD: Townley-----	Moderate	Moderate	Moderate	Moderate	Moderate	Virginia pine----- loblolly pine----- shortleaf pine-----	70 70 60
							Virginia pine, loblolly pine
Sunlight-----	Moderate	Moderate	Moderate	Severe	Slight	Virginia pine----- chestnut oak----- loblolly pine----- shortleaf pine-----	60 50 70 60
							Virginia pine, loblolly pine
UUC. Urban land-Udorthents							
W. Water							
Wa: Wax-----	Slight	Slight	Slight	Moderate	Moderate	loblolly pine----- shortleaf pine----- sweetgum----- yellow-poplar-----	80 70 80 90
							loblolly pine, yellow-poplar, eastern white pine
Rockdell-----	Slight	Slight	Severe	Slight	Moderate	American sycamore--- common hackberry--- sweetgum----- yellow-poplar-----	98 --- 90 100
							black walnut, loblolly pine, white oak, yellow- poplar, eastern white pine

Table 10.--Woodland Management and Productivity--Continued

Map symbol and soil name	Management concerns					Potential productivity		
	Erosion hazard	Equip- ment limita- tion	Seedling mortal- ity	Wind- throw hazard	Plant competi- tion	Common trees	Site index	Suggested trees to plant
WbE2, WbC2: Waynesboro-----	Slight	Slight	Slight	Slight	Moderate	loblolly pine----- southern red oak---- white oak----- yellow-poplar-----	80 70 70 90	black walnut, eastern white pine, loblolly pine, shortleaf pine, yellow- poplar
WbD2: Waynesboro-----	Moderate	Moderate	Moderate	Slight	Moderate	loblolly pine----- southern red oak---- white oak----- yellow-poplar-----	80 70 70 90	black walnut, loblolly pine, shortleaf pine, yellow-poplar
WfB: Wolftever-----	Slight	Slight	Moderate	Slight	Moderate	loblolly pine----- southern red oak---- sweetgum----- white oak----- willow oak----- yellow-poplar-----	80 70 80 70 80 90	loblolly pine, shortleaf pine, yellow-poplar

Table 11.—Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ac: Allegheny-----	Severe: flooding	Slight	Moderate: small stones flooding	Slight	Moderate: flooding
Cotaco-----	Severe: flooding	Moderate: wetness	Moderate: small stones flooding	Severe: erodes easily	Moderate: wetness flooding
AeB: Allen-----	Slight	Slight	Moderate: slope small stones	Slight	Slight
AeC: Allen-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
AeD: Allen-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
AMC: Allen-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Urban land.					
AnB: Altavista-----	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness
AsF: Apison-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope erodes easily	Severe: slope
Sunlight-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope small stones depth to rock	Severe: slope	Severe: slope depth to rock
Salacoa-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
At: Atkins-----	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
BaE: Barfield-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
Rock outcrop.					

Table 11.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BEF: Bethesda-----	Severe: slope	Severe: slope	Severe: slope small stones	Severe: slope	Severe: slope droughty
Mine pits.					
Bm: Bloomingdale---	Severe: flooding wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
CaB: Capshaw-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
CaC: Capshaw-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope
Ch: Cobstone-----	Severe: flooding large stones	Severe: large stones	Severe: large stones small stones	Moderate: large stones	Severe: large stones
CDB: Cobstone-----	Severe: flooding large stones	Severe: large stones	Severe: large stones small stones	Moderate: large stones	Severe: large stones
Shady-----	Severe: flooding	Slight	Moderate: slope small stones	Slight	Slight
Urban land.					
CeC: Colbert-----	Severe: percs slowly	Severe: percs slowly	Severe: percs slowly slope	Slight	Moderate: slope
Lyerly-----	Severe: percs slowly	Severe: percs slowly	Severe: percs slowly slope	Slight	Moderate: depth to rock
CgC: Collegedale---	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Severe: erodes easily	Slight
CgD: Collegedale---	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
CoC: Conasauga-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope depth to rock

Table 11.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Cr: Cranmore-----	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
DeB: Dewey-----	Slight	Slight	Moderate: slope	Slight	Slight
DeC: Dewey-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
DeD: Dewey-----	Severe: slope	Severe: slope	Severe: slope	Slight	Severe: slope
DL. Dumps, landfills					
Ec: Ealy-----	Severe: flooding	Slight	Moderate: flooding small stones	Slight	Moderate: flooding
Craigsville----	Severe: flooding	Moderate: large stones	Severe: small stones	Moderate: large stones	Severe: large stones
Eg: Egam-----	Slight	Moderate: percs slowly	Moderate: percs slowly	Slight	Slight
EtB: Etowah-----	Slight	Slight	Moderate: slope	Slight	Slight
EtC: Etowah-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
FuB: Fullerton-----	Severe: small stones	Severe: small stones	Severe: small stones	Slight	Severe: small stones
FuC: Fullerton-----	Moderate: slope small stones	Moderate: slope small stones	Severe: slope small stones	Slight	Moderate: slope
FuD: Fullerton-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
FuF: Fullerton-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
GpC: Gilpin-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope thin layer

Table 11.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GpD: Gilpin-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
GpF: Gilpin-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
GuF: Gilpin-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Bouldin-----	Severe: slope	Severe: slope	Severe: slope small stones	Severe: slope	Severe: slope
Petros-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope small stones depth to rock	Severe: slope	Severe: slope depth to rock
Ha: Hamblen-----	Severe: flooding	Moderate: wetness	Moderate: flooding wetness	Slight	Moderate: flooding
HoB: Holston-----	Slight	Slight	Moderate: slope small stones	Slight	Slight
HoC: Holston-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
JeC: Jefferson-----	Moderate: large stones slope	Moderate: large stones slope	Severe: large stones slope small stones	Moderate: large stones	Severe: large stones
JsD: Jefferson-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
Shelocta-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
JsF: Jefferson-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Shelocta-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Table 11.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
JvD: Jefferson-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
Varilla-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Moderate: large stones slope	Severe: large stones slope
Shelocta-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
JvF: Jefferson-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Varilla-----	Severe: slope	Severe: slope	Severe: large stones slope small stones	Severe: slope	Severe: large stones slope
Shelocta-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Kt: Ketona-----	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness	Severe: wetness	Severe: flooding wetness
Tupelo-----	Severe: flooding wetness	Moderate: percs slowly wetness	Severe: wetness	Moderate: wetness	Moderate: flooding wetness
LhB: Lily-----	Slight	Slight	Moderate: slope depth to rock	Slight	Moderate: depth to rock
LhC: Lily-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope depth to rock
LhD: Lily-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
LhE: Lily-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
LnB: Lonewood-----	Slight	Slight	Moderate: slope	Severe: erodes easily	Slight
Hendon-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LnC: Lonewood-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope
Hendon-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope
PaC: Pailo-----	Severe: small stones	Severe: small stones	Severe: slope small stones	Severe: small stones	Severe: small stones
PaD: Pailo-----	Severe: slope small stones	Severe: slope small stones	Severe: slope small stones	Severe: small stones	Severe: small stones slope
PaF: Pailo-----	Severe: slope small stones	Severe: slope small stones	Severe: slope small stones	Severe: slope small stones	Severe: small stones slope
PCF. Pits, clay					
PM. Pits, mine, and dumps					
Pp: Pope-----	Severe: flooding	Moderate: flooding	Severe: flooding	Severe: erodes easily	Severe: flooding
Philo-----	Severe: flooding	Moderate: flooding wetness	Severe: flooding	Moderate: flooding wetness	Severe: flooding
RaC: Ramsey-----	Severe: depth to rock	Severe: depth to rock	Severe: slope depth to rock	Slight	Severe: depth to rock
RrD: Ramsey-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Moderate: slope	Severe: slope depth to rock
Rock outcrop.					
RrF: Ramsey-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock
Rock outcrop.					
SaC: Salacoa-----	Moderate: slope small stones	Moderate: slope small stones	Severe: slope small stones	Slight	Moderate: slope small stones

Table 11.—Recreational Development—Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SgE: Sequoia-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Gilpin-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
ShB: Shady-----	Slight	Slight	Moderate: slope small stones	Slight	Slight
Sm: Shady-----	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
St: Staser-----	Slight	Slight	Slight	Slight	Slight
TaD: Talbutt-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope depth to rock
Rock outcrop.					
TmB: Tasso-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight
Minvale-----	Slight	Slight	Moderate: slope small stones	Slight	Slight
TmC: Tasso-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Severe: erodes easily	Moderate: slope
Minvale-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
TmD: Tasso-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
Minvale-----	Severe: slope	Severe: slope	Severe: slope small stones	Moderate: slope	Severe: slope
TsC: Townley-----	Moderate: percs slowly slope	Moderate: percs slowly slope	Severe: slope	Slight	Moderate: slope depth to rock
Sunlight-----	Severe: depth to rock	Severe: depth to rock	Severe: slope small stones depth to rock	Slight	Severe: depth to rock

Table 11.--Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TsD: Townley-----	Severe: slope	Severe: slope	Severe: slope small stones	Moderate: slope	Severe: slope
Sunlight-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope small stones depth to rock	Moderate: slope	Severe: slope depth to rock
UUC. Urban land- Udorthents					
W. Water					
Wa: Wax-----	Severe: flooding	Moderate: percs slowly wetness	Moderate: flooding small stones	Slight	Moderate: flooding
Rockdell-----	Severe: flooding	Severe: small stones	Severe: flooding	Slight	Moderate: flooding small stones droughty
WbB2: Waynesboro----	Slight	Slight	Moderate: slope	Slight	Slight
WbC2: Waynesboro----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
WbD2: Waynesboro----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
WfB: Wolftever-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: percs slowly slope	Slight	Slight

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

[illegible]

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
Bm: Bloomingdale--	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
CaB: Capshaw-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
CaC: Capshaw-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Cb: Cobstone-----	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
CDB: Cobstone-----	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Shady-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Urban land.										
CeC: Colbert-----	Fair	Good	Fair	Good	Good	Very poor	Very poor	Good	Good	Very poor
Lyerly-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
CgC: Collegedale---	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
CgD: Collegedale---	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
CoC: Conasauga-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Cr: Cranmore-----	Fair	Fair	Poor	Fair	Fair	Good	Good	Fair	Fair	Good
DeB: Dewey-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
DeC: Dewey-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
DeD: Dewey-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
DL. Dumps, landfills										
Ec:										
Ealy-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Craigsville---	Poor	Fair	Fair	Fair	Fair	Poor	Very poor	Fair	Fair	Very poor
Eg:										
Egam-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
EtB:										
Etowah-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
EtC:										
Etowah-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
FuB:										
Fullerton-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
FuC:										
Fullerton-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
FuD:										
Fullerton-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
FuF:										
Fullerton-----	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
GpC:										
Gilpin-----	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
GpD:										
Gilpin-----	Poor	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
GpF:										
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
GuF:										
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Bouldin-----	Very poor	Very poor	Fair	Good	Good	Very poor	Very poor	Poor	Fair	Very poor
Petros-----	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor

Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
Ha: Hamblen-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
HoB: Holston-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
HoC: Holston-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
JeC: Jefferson-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JsD: Jefferson-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Shelocta-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JsF: Jefferson-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Shelocta-----	Very poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JvD: Jefferson-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Varilla-----	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Shelocta-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
JvF: Jefferson-----	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Varilla-----	Very poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Shelocta-----	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Kt: Ketona-----	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair
Tupelo-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
LhB: Lily-----	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor



Table 12.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
SaC: Salacoa-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
SgE: Sequoia-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Gilpin-----	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
ShB: Shady-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Sm: Shady-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
St: Staser-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
TaD: Talbott-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Rock outcrop.										
TmB: Tasso-----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Minvale-----	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
TmC: Tasso-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Minvale-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
TmD: Tasso-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Minvale-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
TsC: Townley-----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Sunlight-----	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor

Table 12.—Wildlife Habitat—Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
TsD: Townley-----	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Sunlight-----	Poor	Poor	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
UUC. Urban land- Udorthents										
W. Water										
Wa: Wax-----	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Poor	Poor
Rockdell-----	Poor	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Very poor
WbB2: Waynesboro----	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WbC2, WbD2: Waynesboro----	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
WfB: Wolftever-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor



Table 13.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
At: Atkins-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action wetness	Severe: flooding wetness
BaE: Barfield-----	Severe: slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: shrink-swell slope depth to rock	Severe: low strength shrink-swell depth to rock	Severe: slope depth to rock
Rock outcrop.						
BEF: Bethesda-----	Severe: slope	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope droughty
Mine pits.						
Bm: Bloomingdale-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: wetness
CaB: Capshaw-----	Moderate: too clayey wetness depth to rock	Moderate: shrink-swell	Moderate: shrink-swell wetness depth to rock	Moderate: shrink-swell	Severe: low strength	Slight
CaC: Capshaw-----	Moderate: too clayey wetness depth to rock	Moderate: shrink-swell slope	Moderate: slope wetness depth to rock	Severe: slope	Severe: low strength	Moderate: slope
Cb: Cobstone-----	Moderate: large stones	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding large stones	Severe: large stones

Table 13.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CDB: Cobstone-----	Moderate: large stones	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding large stones	Severe: large stones
Shady-----	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding	Slight
Urban land.						
CeC: Colbert-----	Moderate: slope too clayey depth to rock	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell slope	Severe: low strength shrink-swell	Moderate: slope
Lyerly-----	Severe: depth to rock	Severe: shrink-swell	Severe: shrink-swell depth to rock	Severe: shrink-swell	Severe: low strength shrink-swell	Moderate: depth to rock
CgC: Collegedale-----	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
CgD: Collegedale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
CoC: Conasauga-----	Moderate: slope too clayey depth to rock	Moderate: shrink-swell slope	Moderate: shrink-swell slope depth to rock	Severe: slope	Severe: low strength	Moderate: slope depth to rock
Cr: Cranmore-----	Severe: wetness cutbanks cave	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding frost action wetness	Severe: flooding wetness
DeB: Dewey-----	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: low strength shrink-swell	Slight





Table 13.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
JvD, JvF: Varilla-----	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: large stones slope
Shelocta-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Kt: Ketona-----	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: flooding wetness
Tupelo-----	Severe: wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding shrink-swell wetness	Severe: flooding low strength shrink-swell	Moderate: flooding wetness
LhB: Lily-----	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: depth to rock	Moderate: depth to rock	Moderate: depth to rock
LhC: Lily-----	Severe: depth to rock	Moderate: slope depth to rock	Severe: depth to rock	Severe: slope	Moderate: slope depth to rock	Moderate: slope depth to rock
LhD, LhE: Lily-----	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock	Severe: slope	Severe: slope	Severe: slope
LnB: Lonewood-----	Moderate: depth to rock	Slight	Moderate: depth to rock	Slight	Severe: low strength	Slight
Hendon-----	Slight	Slight	Slight	Moderate: slope	Slight	Slight
LnC: Lonewood-----	Moderate: slope depth to rock	Moderate: slope	Moderate: slope depth to rock	Severe: slope	Severe: low strength	Moderate: slope
Hendon-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope



Table 13.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ShB: Shady-----	Slight	Slight	Slight	Slight	Slight	Slight
Sm: Shady-----	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
St: Staser-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Slight	Slight
TaD: Talbott-----	Severe: depth to rock	Moderate: shrink-swell slope depth to rock	Severe: depth to rock	Severe: slope	Severe: low strength	Moderate: slope depth to rock
Rock outcrop.						
TmB: Tasso-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Moderate: low strength	Slight
Minvale-----	Slight	Slight	Slight	Slight	Slight	Slight
TmC: Tasso-----	Moderate: slope too clayey	Moderate: slope	Moderate: shrink-swell slope	Severe: slope	Moderate: low strength slope	Moderate: slope
Minvale-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope
TmD: Tasso-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Minvale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
TsC: Townley-----	Moderate: slope too clayey depth to rock	Moderate: shrink-swell slope depth to rock	Moderate: shrink-swell slope depth to rock	Severe: slope	Severe: low strength	Moderate: slope depth to rock
Sunlight-----	Severe: depth to rock	Moderate: slope depth to rock	Severe: depth to rock	Severe: slope	Moderate: slope depth to rock	Severe: depth to rock

Table 13.—Building Site Development—Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
TSD: Townley-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Sunlight-----	Severe: slope depth to rock	Severe: slope	Severe: slope depth to rock	Severe: slope	Severe: slope	Severe: slope depth to rock
UUC. Urban land-Udorthents						
W. Water						
Wa: Wax-----	Severe: wetness	Severe: flooding	Severe: flooding wetness	Severe: flooding	Severe: flooding	Moderate: flooding
Rockdell-----	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding small stones droughty
WB2: Waynesboro-----	Moderate: too clayey	Slight: slope	Slight	Slight	Moderate: low strength	Slight
WB2: Waynesboro-----	Moderate: too clayey slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope
WBD2: Waynesboro-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
WFB: Wolftever-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: wetness	Moderate: shrink-swell	Severe: low strength	Slight

Table 14.—Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ac: Allegheny-----	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Fair: small stones too clayey
Cotaco-----	Severe: flooding wetness	Severe: seepage flooding wetness	Severe: flooding wetness	Severe: seepage wetness flooding	Poor: small stones wetness
AeB: Allen-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
AeC: Allen-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
AeD: Allen-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
AMC: Allen-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Urban land.					
AnB: Altavista-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
AsF: Apison-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: depth to rock slope
Sunlight-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope small stones depth to rock
Salacoa-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
At: Atkins-----	Severe: flooding percs slowly wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Poor: wetness

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BaE: Barfield-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope too clayey depth to rock	Severe: slope depth to rock	Poor: hard to pack too clayey depth to rock
Rock outcrop.					
BEF: Bethesda-----	Severe: percs slowly slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Severe: slope unstable fill	Poor: slope small stones
Mine pits.					
Bm: Bloomingdale-----	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
CaB: Capshaw-----	Severe: percs slowly wetness	Moderate: slope depth to rock	Severe: too clayey wetness depth to rock	Moderate: wetness depth to rock	Poor: hard to pack too clayey
CaC: Capshaw-----	Severe: percs slowly wetness	Severe: slope	Severe: too clayey wetness depth to rock	Moderate: slope wetness depth to rock	Poor: hard to pack too clayey
Cb: Cobstone-----	Moderate: flooding large stones	Severe: large stones seepage	Severe: large stones seepage	Severe: seepage	Poor: small stones
CDB: Cobstone-----	Moderate: flooding large stones	Severe: large stones seepage	Severe: large stones seepage	Severe: seepage	Poor: small stones
Shady-----	Moderate: flooding	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Urban land.					
CeC: Colbert-----	Severe: percs slowly wetness	Severe: slope	Severe: too clayey depth to rock	Moderate: slope depth to rock	Poor: hard to pack too clayey
Lyerly-----	Severe: depth to rock	Severe: depth to rock	Severe: too clayey depth to rock	Severe: depth to rock	Poor: hard to pack too clayey depth to rock

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CgC: Collegedale-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Slight	Poor: hard to pack too clayey
CgD: Collegedale-----	Severe: percs slowly slope	Severe: slope	Severe: slope too clayey	Severe: slope	Poor: hard to pack slope too clayey
CoC: Conasauga-----	Severe: percs slowly depth to rock	Severe: slope depth to rock	Severe: too clayey depth to rock	Severe: depth to rock	Poor: hard to pack too clayey depth to rock
Cr: Cranmore-----	Severe: flooding percs slowly wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Severe: flooding seepage wetness	Poor: wetness
DeB: Dewey-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: hard to pack too clayey
DeC: Dewey-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: hard to pack too clayey slope
DeD: Dewey-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
DL. Dumps, landfills					
Ec: Ealy-----	Severe: flooding	Severe: flooding seepage	Severe: flooding seepage wetness	Severe: flooding seepage	Fair: too sandy
Craigsville-----	Severe: large stones poor filter	Severe: large stones seepage	Severe: large stones seepage	Severe: seepage	Poor: large stones seepage
Eg: Egam-----	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey
EtB: Etowah-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
EtC: Etowah-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: too clayey
FuB: Fullerton-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Poor: small stones
FuC: Fullerton-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Poor: small stones
FuD, FuF: Fullerton-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope small stones
GpC: Gilpin-----	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: area reclaim thin layer
GpD, GpF: Gilpin-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: area reclaim slope thin layer
GuF: Gilpin-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: area reclaim slope thin layer
Bouldin-----	Severe: slope slippage	Severe: seepage slope	Severe: large stones seepage slope	Severe: seepage slope	Poor: large stones slope
Petros-----	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: slope depth to rock	Poor: slope depth to rock
Ha: Hamblen-----	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Fair: wetness
HoB: Holston-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: small stones too clayey
HoC: Holston-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope small stones too clayey

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
JeC: Jefferson-----	Moderate: large stones slope	Severe: seepage slope	Severe: seepage	Severe: seepage	Poor: large stones
JsD, JsF: Jefferson-----	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Shelocta-----	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones
JvD, JvF: Jefferson-----	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: large stones slope
Varilla-----	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope depth to rock	Severe: seepage slope	Poor: large stones slope
Shelocta-----	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: slope	Poor: slope small stones
Kt: Ketona-----	Severe: flooding percs slowly wetness	Severe: flooding	Severe: flooding wetness depth to rock	Severe: flooding wetness	Poor: hard to pack too clayey wetness
Tupelo-----	Severe: flooding percs slowly wetness	Slight	Severe: flooding too clayey wetness	Severe: flooding wetness	Poor: hard to pack too clayey wetness
LhB: Lily-----	Severe: depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
LhC: Lily-----	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
LhD, LhE: Lily-----	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
LnB: Lonewood-----	Moderate: percs slowly depth to rock	Moderate: seepage slope depth to rock	Severe: depth to rock	Moderate: depth to rock	Fair: too clayey depth to rock

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
LnB: Hendon-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
LnC: Lonewood-----	Moderate: percs slowly slope depth to rock	Severe: slope	Severe: depth to rock	Moderate: slope depth to rock	Fair: slope too clayey depth to rock
Hendon-----	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
PaC: Pailo-----	Moderate: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope small stones
PaD: Pailo-----	Severe: slope	Severe: seepage slope	Severe: seepage	Severe: seepage	Poor: small stones
PaF: Pailo-----	Severe: slope	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: slope small stones
PCF. Pits, clay					
PM. Pits, mine, and dumps					
Pp: Pope-----	Severe: flooding	Severe: flooding seepage	Severe: flooding seepage	Severe: flooding seepage	Good
Philo-----	Severe: flooding wetness	Severe: flooding seepage wetness	Severe: flooding seepage depth to rock	Severe: flooding wetness	Fair: small stones wetness depth to rock
RaC: Ramsey-----	Severe: depth to rock	Severe: seepage slope depth to rock	Severe: seepage depth to rock	Severe: seepage depth to rock	Poor: depth to rock
RrD, RrF: Ramsey-----	Severe: slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Severe: seepage slope depth to rock	Poor: slope depth to rock
Rock outcrop.					

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SaC: Salacoa-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope small stones too clayey
SgE: Sequoia-----	Severe: percs slowly slope depth to rock	Severe: slope depth to rock	Severe: slope too clayey depth to rock	Severe: slope depth to rock	Poor: hard to pack too clayey depth to rock
Gilpin-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: area reclaim slope thin layer
ShB: Shady-----	Moderate: percs slowly	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Sm: Shady-----	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Poor: small stones
St: Staser-----	Moderate: wetness	Severe: seepage	Severe: seepage	Severe: seepage wetness	Good
TaD: Talbutt-----	Severe: percs slowly depth to rock	Severe: slope depth to rock	Severe: too clayey depth to rock	Severe: depth to rock	Poor: hard to pack too clayey depth to rock
Rock outcrop.					
TmB: Tasso-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Minvale-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: small stones too clayey
TmC: Tasso-----	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Minvale-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: small stones too clayey
TmD: Tasso-----	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Fair: slope too clayey

Table 14.—Sanitary Facilities—Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TmD: Minvale-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
TsC: Townley-----	Severe: percs slowly depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: hard to pack too clayey depth to rock
Sunlight-----	Severe: depth to rock	Severe: slope depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: small stones depth to rock
TsD: Townley-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: hard to pack too clayey depth to rock
Sunlight-----	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: slope small stones depth to rock
UUC. Urban land- Udorthents					
W. Water					
Wa: Wax-----	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding	Poor: small stones
Rockdell-----	Severe: flooding	Severe: flooding seepage	Severe: flooding seepage	Severe: flooding seepage	Poor: seepage small stones
WbB2: Waynesboro-----	Moderate: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: hard to pack too clayey
WbC2: Waynesboro-----	Moderate: percs slowly slope	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: hard to pack slope too clayey
WbD2: Waynesboro-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
WfB: Wolftever-----	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey

Table 15.—Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ac: Allegheny-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim small stones
Cotaco-----	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
AeB, AeC: Allen-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones
AeD: Allen-----	Fair: low strength slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
AMC: Allen-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Urban land.				
AnB: Altavista-----	Fair: low strength wetness	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
AsF: Apison-----	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
Sunlight-----	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones depth to rock
Salacoa-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
At: Atkins-----	Poor: wetness	Improbable: excess fines	Improbable: excess fines	Poor: wetness
BaE: Barfield-----	Poor: low strength shrink-swell depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones too clayey depth to rock
Rock outcrop.				

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
BEF: Bethesda-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
Mine pits.				
Bm: Bloomingdale-----	Poor: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
CaB, CaC: Capshaw-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Cb: Cobstone-----	Fair: large stones	Improbable: large stones excess fines	Improbable: large stones excess fines	Poor: area reclaim small stones
CDB: Cobstone-----	Improbable: large stones	Improbable: large stones excess fines	Improbable: large stones excess fines	Poor: area reclaim small stones
Shady-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
Urban land.				
CeC: Colbert-----	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Lyerly-----	Poor: low strength shrink-swell depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
CgC: Collegedale-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
CgD: Collegedale-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
CoC: Conasauga-----	Poor: low strength depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Cr: Cranmore-----	Poor: wetness	Probable	Probable	Poor: wetness

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
DeB, DeC: Dewey-----	Fair: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
DeD: Dewey-----	Fair: low strength shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
DL. Dumps, landfills				
Ec: Ealy-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Craigsville-----	Poor: large stones	Improbable: large stones	Improbable: large stones	Poor: area reclaim small stones
Eg: Egam-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: thin layer too clayey
EtB: Etowah-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones too clayey
EtC: Etowah-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
FuB, FuC: Fullerton-----	Fair: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones too clayey
FuD: Fullerton-----	Fair: low strength shrink-swell slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones too clayey
FuF: Fullerton-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones too clayey
GpC: Gilpin-----	Poor: thin layer	Improbable: excess fines	Improbable: excess fines	Poor: small stones

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
GpD: Gilpin-----	Poor: thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones
GpF: Gilpin-----	Poor: slope thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones
GuF: Gilpin-----	Poor: slope thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones
Bouldin-----	Poor: slope	Improbable: large stones excess fines	Improbable: large stones excess fines	Poor: area reclaim slope small stones
Petros-----	Poor: slope depth to rock	Improbable: small stones	Improbable: thin layer	Poor: slope small stones depth to rock
Ha: Hamblen-----	Fair: low strength wetness	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim small stones
HoB, HoC: Holston-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
JeC: Jefferson-----	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones
JsD: Jefferson-----	Fair: large stones slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Shelocta-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
JsF: Jefferson-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Shelocta-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
JvD: Jefferson-----	Fair: large stones slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Varilla-----	Fair: large stones slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Shelocta-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
JvF: Jefferson-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Varilla-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim large stones slope
Shelocta-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
Kt: Ketona-----	Poor: low strength shrink-swell wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey wetness
Tupelo-----	Poor: low strength shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
LhB, LhC: Lily-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim small stones
LhD: Lily-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
LhE: Lily-----	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
LnB: Lonewood-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: small stones too clayey
Hendon-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
LnC: Lonewood-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones too clayey
Hendon-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: slope too clayey
PaC: Pailo-----	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
PaD: Pailo-----	Fair: large stones slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
PaF: Pailo-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
PCF. Pits, clay				
PM. Pits, mine, and dumps				
Pp: Pope-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim
Philo-----	Fair: wetness depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
RaC: Ramsey-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones depth to rock
RrD: Ramsey-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones depth to rock
Rock outcrop.				
RrF: Ramsey-----	Poor: slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones depth to rock
Rock outcrop.				

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
SaC: Salacoa-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope small stones
SgE: Sequoia-----	Poor: low strength slope depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
Gilpin-----	Poor: slope thin layer	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones
ShB, Sm: Shady-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
St: Staser-----	Good	Improbable: excess fines	Improbable: excess fines	Good
TaD: Talbutt-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Rock outcrop.				
TmB, TmC: Tasso-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Minvale-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
TmD: Tasso-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: small stones slope
Minvale-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim slope small stones
TsC: Townley-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Sunlight-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones depth to rock
TsD: Townley-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
Sunlight-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope small stones depth to rock

Table 15.—Construction Materials—Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
UUC. Urban land- Udorthents				
W. Water				
Wa: Wax-----	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim small stones
Rockdell-----	Fair: large stones	Improbable: small stones	Probable	Poor: area reclaim small stones
WbB2, WbC2: Waynesboro-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
WbD2: Waynesboro-----	Fair: low strength slope	Improbable: excess fines	Improbable: excess fines	Poor: slope too clayey
WfB: Wolftever-----	Fair: low strength wetness	Improbable: excess fines	Improbable: excess fines	Poor: thin layer

Table 16.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ac: Allegheny-----	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: flooding	Favorable	Favorable
Cotaco-----	Moderate: seepage	Severe: piping wetness	Moderate: slow refill	Limitation: flooding	Limitation: wetness droughty	Limitation: erodes easily wetness	Limitation: erodes easily droughty
AeB: Allen-----	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
AeC, AeD: Allen-----	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
AMC: Allen-----	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Urban land.							
AnB: Altavista-----	Moderate: seepage	Severe: piping wetness	Moderate: slow refill deep to water	Favorable	Limitation: wetness	Limitation: wetness	Favorable
AsF: Apison-----	Severe: slope	Severe: piping thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock erodes easily	Limitation: slope erodes easily depth to rock	Limitation: slope erodes easily depth to rock
Sunlight-----	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Salacoa-----	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
At: Atkins-----	Severe: seepage	Severe: piping wetness	Severe: slow refill	Limitation: flooding frost action percs slowly	Limitation: flooding percs slowly wetness	Limitation: percs slowly wetness	Limitation: percs slowly wetness
BaE: Barfield-----	Severe: slope depth to rock	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Rock outcrop.							
BEF: Bethesda-----	Severe: slope	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope slippage	Limitation: large stones slope droughty
Mine pits.							
Bm: Bloomingtondale-----	Moderate: seepage	Severe: hard to pack wetness	Moderate: slow refill	Limitation: flooding	Limitation: erodes easily flooding wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
CaB: Capshaw-----	Moderate: slope depth to rock	Severe: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly	Limitation: erodes easily percs slowly
CaC: Capshaw-----	Severe: slope	Severe: hard to pack	Severe: slow refill	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope
Cb: Cobstone-----	Severe: seepage	Severe: large stones seepage	Severe: no water	Limitation: deep to water	Limitation: large stones droughty	Limitation: large stones	Limitation: large stones droughty

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CDB: Cobstone-----	Severe: seepage	Severe: large stones seepage	Severe: no water	Limitation: deep to water	Limitation: large stones droughty	Limitation: large stones	Limitation: large stones droughty
Shady-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Favorable	Favorable
Urban land.							
CeC: Colbert-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
Lyerly-----	Moderate: slope depth to rock	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope depth to rock	Limitation: percs slowly slope depth to rock	Limitation: erodes easily percs slowly depth to rock
CgC: Collegedale-----	Moderate: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
CgD: Collegedale-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
CoC: Conasauga-----	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
Cr: Cranmore-----	Severe: seepage	Severe: piping wetness	Severe: slow refill cutbanks cave	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Limitation: wetness
DeB: Dewey-----	Moderate: seepage	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
DeC, DeD: Dewey-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope

Table 16.—Water Management—Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
DL. Dumps, landfills							
Ec: Early-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: flooding	Favorable	Favorable
Craigsville-----	Severe: seepage	Severe: large stones seepage	Severe: no water	Limitation: deep to water	Limitation: large stones droughty	Limitation: large stones too sandy soil blowing	Limitation: large stones droughty
Eg: Egam-----	Slight	Moderate: hard to pack thin layer wetness	Severe: slow refill	Limitation: deep to water	Favorable	Limitation: wetness	Favorable
EtB: Etawah-----	Moderate: seepage slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
EtC: Etawah-----	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
FuB: Fullerton-----	Moderate: seepage slope	Severe: hard to pack piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: large stones	Limitation: large stones
FuC, FuD, FuF: Fullerton-----	Severe: slope	Severe: hard to pack piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: large stones slope	Limitation: large stones slope
GpC, GpD, GpF: Gilpin-----	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock
GuF: Gilpin-----	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
GuF: Bouldin-----	Severe: seepage slope	Severe: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
Petros-----	Severe: slope depth to rock	Severe: seepage thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock droughty	Limitation: slope depth to rock droughty
Ha: Hamblen-----	Moderate: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: flooding	Limitation: flooding wetness	Limitation: wetness	Favorable
HoB: Holston-----	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
HoC: Holston-----	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
JeC: Jefferson-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
JSD, JsF: Jefferson-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
Shelocta-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
JvD, JvF: Jefferson-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope	Limitation: large stones slope	Limitation: large stones slope
Varilla-----	Severe: seepage slope	Severe: large stones seepage	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope too sandy	Limitation: large stones slope droughty

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
JvD, JvF: Shelocta-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Kt: Ketona-----	Moderate: depth to rock	Severe: wetness	Severe: slow refill	Limitation: flooding percs slowly	Limitation: flooding percs slowly wetness	Limitation: percs slowly wetness	Limitation: percs slowly wetness
Tupelo-----	Slight	Severe: hard to pack wetness	Severe: slow refill	Limitation: flooding percs slowly	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness	Limitation: erodes easily percs slowly wetness
LhB: Lily-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: depth to rock	Limitation: depth to rock
LhC, LhD: Lily-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
LhE: Lily-----	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
LnB: Lonewood-----	Moderate: seepage slope depth to rock	Moderate: piping thin layer	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
Hendon-----	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
LnC: Lonewood-----	Severe: slope	Moderate: piping thin layer	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Hendon-----	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PaC, PaD, PaF: Pailo-----	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
PCF. Pits, clay							
PM. Pits, mine, and dumps							
Pp: Pope-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily	Limitation: erodes easily	Limitation: erodes easily
Philo-----	Severe: seepage	Severe: piping wetness	Severe: cutbanks cave	Limitation: flooding	Limitation: erodes easily wetness	Limitation: erodes easily wetness	Limitation: erodes easily
RaC: Ramsey-----	Severe: slope depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
RrD, RrF: Ramsey-----	Severe: slope depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Rock outcrop.							
SaC: Salacoa-----	Moderate: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
SgE: Sequoia-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily slope depth to rock droughty	Limitation: erodes easily slope depth to rock droughty
Gilpin-----	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: large stones slope depth to rock

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
ShB: Shady-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Favorable	Favorable	Favorable
Sm: Shady-----	Severe: seepage	Severe: piping	Severe: no water	Limitation: flooding deep to water	Limitation: erodes easily flooding	Limitation: erodes easily	Limitation: erodes easily
St: Staser-----	Severe: seepage	Severe: piping	Moderate: slow refill deep to water	Limitation: deep to water	Favorable	Favorable	Favorable
TaD: Talbutt-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
Rock outcrop.							
TmB: Tasso-----	Moderate: seepage slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily
Minvale-----	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
TmC, TmD: Tasso-----	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Minvale-----	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
TsC: Townley-----	Severe: slope	Severe: hard to pack	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
TSC: Sunlight-----	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: droughty depth to rock slope	Limitation: slope depth to rock	Limitation: slope droughty depth to rock
TSD: Townley-----	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
Sunlight-----	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
UUC. Urban land- Udorthents							
W. Water							
Wa: Wax-----	Slight	Moderate: wetness	Severe: slow refill	Limitation: flooding percs slowly	Limitation: percs slowly rooting depth wetness	Limitation: erodes easily rooting depth wetness	Limitation: erodes easily percs slowly rooting depth
Rockdell-----	Severe: seepage	Severe: large stones seepage	Moderate: deep to water	Limitation: flooding deep to water	Limitation: flooding large stones droughty	Limitation: large stones	Limitation: large stones droughty
WbB2: Waynesboro-----	Moderate: seepage slope	Severe: hard to pack piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
WbC2, WbD2: Waynesboro-----	Severe: slope	Severe: hard to pack piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope

Table 16.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
WfB: Wolftever-----	Moderate: slope	Severe: hard to pack	Severe: slow refill	Limitation: slope	Limitation: erodes easily slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily

Table 17.—Engineering Index Properties

(Absence of an entry indicates that no data are available or the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	Pct	4	10	40	200		
	In				Pct	Pct						Pct	
Ac: Allegheny-----	0-6	Loam	CL-ML, CL, ML	A-4	0	0	0	90-100	80-100	65-100	55-95	15-35	NP-10
	6-12	Loam	ML, CL, CL-ML	A-4	0	0	0	90-100	80-100	65-100	55-95	15-35	NP-10
	12-21	Clay loam, loam, sandy clay loam, gravelly clay loam	CL, ML, SC, SM	A-4, A-6	0	0	0	68-92	57-90	46-90	20-72	15-35	NP-15
	21-36	Clay loam, loam, sandy clay loam, gravelly clay loam	ML, SC, SM, CL	A-4, A-6	0	0	0	68-92	57-90	46-90	20-72	15-35	NP-15
	36-60	Gravelly clay loam, sandy loam, very gravelly sandy loam	CL, GC, ML, SM	A-1, A-2, A-4, A-6	---	0-5	0	62-92	50-90	30-90	15-72	15-35	NP-15
Cotaco-----	0-4	Loam	ML, SM, SC	A-4	0	0	0	80-100	75-95	55-85	35-80	19-45	3-18
	4-24	Gravelly sandy clay loam, clay loam, loam, gravelly loam	CL-ML, SC, CL, GC	A-2, A-4, A-6	0	0-10	0	64-92	51-90	41-90	18-72	23-39	7-16
	24-45	Gravelly sandy clay loam, clay loam, loam, gravelly loam	CL-ML, SC, GC, CL	A-2, A-4, A-6	0	0-10	0	64-92	51-90	41-90	18-72	23-39	7-16
	45-60	Gravelly sandy clay loam, clay loam, loam, very gravelly fine sandy loam, gravelly sandy loam	CL-ML, GC, CL, SC	A-1-b, A-2, A-4, A-6	0	0-10	0	50-92	36-90	29-90	13-81	21-39	6-16

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
AeB, AeC, AeD: Allen-----	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
	0-6	Loam	CL-ML, ML, SC-SM, SM	A-4	---	0-5	90-100	75-100	65-98	40-80	15-26	NP-10
	6-42	Clay loam, sandy clay loam, loam	CL A-4, CL A-4, A-6, A-7-6	---	0-10	85-100	75-100	65-98	40-80	20-43	4-19	
	42-48	Gravelly clay loam, gravelly sandy clay loam, gravelly loam	CL, CL-ML, SC, SC-SM A-7-6	---	0-15	70-92	50-90	47-90	21-72	20-43	4-19	
	48-56	Clay loam, sandy clay loam, clay	CL, CL-ML, SC, SC-SM A-7-6	---	0-10	85-100	70-98	60-95	45-80	21-48	5-22	
	56-72	Gravelly clay loam, gravelly sandy clay loam, gravelly loam	SC-SM, CL, CL-ML, SC A-7-6	---	0-15	70-92	50-90	47-90	21-72	20-43	4-19	
AMC: Allen-----	0-6	Loam	SM, SC-SM, ML, CL-ML	A-4	---	0-5	90-100	75-100	65-98	40-80	15-26	NP-10
	6-42	Clay loam, sandy clay loam, loam	CL-ML, CL, SC A-4, A-6, A-7-6	---	0-10	85-100	75-100	65-98	40-80	20-43	4-19	
	42-48	Gravelly clay loam, gravelly sandy clay loam, gravelly loam	SC-SM, SC, CL-ML, CL A-7-6	---	0-15	70-92	50-90	47-90	21-72	20-43	4-19	
	48-56	Clay loam, sandy clay loam, clay	CL, CL-ML, SC-SM, SC A-7-6	---	0-10	85-100	70-98	60-95	45-80	21-48	5-22	
Urban land.	56-72	Gravelly clay loam, gravelly sandy clay loam, gravelly loam	CL, SC-SM, SC, CL-ML A-7-6	---	0-15	70-92	50-90	47-90	21-72	20-43	4-19	





Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
BEF: Bethesda-----	0-2	Channery loam	GM, ML, CL-ML, GC-GM	A-4, A-6	---	0-15	65-90	55-80	50-80	35-75	25-40	4-14
	2-23	Very channery loam, very channery clay loam, very channery silty clay loam, channery clay loam	ML, GM, GC-GM, CL	A-2, A-4, A-6, A-7	---	10-30	45-80	25-65	25-65	20-60	24-50	3-23
	23-38	Very channery loam, very channery clay loam, very channery silty clay loam, channery clay loam	CL, GC-GM, ML, GM	A-2, A-4, A-6, A-7	---	10-30	45-80	25-65	25-65	20-60	24-50	3-23
	38-45	Very channery loam, very channery clay loam, very channery silty clay loam, channery clay loam	GC-GM, GM, ML, CL	A-2, A-4, A-6, A-7	---	10-30	45-80	25-65	25-65	20-60	24-50	3-23
Mine pits.	45-60	Cobbly loam, very channery clay loam, very channery silty clay loam, channery clay loam	CL, GC-GM, GM, ML	A-2, A-4, A-6, A-7	---	10-30	45-80	25-65	25-65	20-60	24-50	3-23
Bm: Bloomingdale----	0-6	Silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-100	60-95	25-40	5-15
	6-72	Silty clay loam, silty clay, clay	CL, CH	A-6, A-7	0	0	95-100	95-100	90-100	85-95	35-55	12-30

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
CaB, CaC: Capshaw-----	0-4	Silt loam	CL, ML, CL-ML	A-4	0	0	0	90-100	85-100	80-95	75-85	18-30
	4-24	Silty clay loam, silty clay, silt loam	CL	A-6, A-7	0	0	0	90-100	85-100	80-95	75-85	3-10 11-20
	24-36	Clay, silty clay, silty clay loam	CH, CL	A-7	0	0	0	90-100	85-100	80-95	75-90	18-36
	36-72	Clay, silty clay	CH, CL	A-7	---	0-3	---	85-100	80-100	75-95	70-90	18-36
	72-76	Weathered bedrock			---	---	---	---	---	---	---	---
Cb: Cobstone-----	0-5	Cobbly fine sandy loam	SM, SC-SM	A-2, A-4	---	20-35	---	75-85	65-80	50-70	30-50	NP-6
	5-12	Cobbly loam, cobbly sandy loam, cobbly fine sandy loam	SM, SC-SM	A-2, A-4	---	20-35	---	75-85	65-80	50-70	30-50	NP-6
	12-28	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly sandy loam	GC-GM, SM, GM, SC-SM	A-2, A-4	---	35-50	---	55-85	40-80	35-70	25-55	3-10
	28-63	Extremely cobbly loam, extremely cobbly fine sandy loam, extremely cobbly sandy loam	SC-SM, GM, GC-GM, SM	A-1, A-2, A-4	---	40-55	---	50-75	35-70	25-60	15-45	NP-6

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
CDB: Cobstone-----	0-5	Cobbly fine sandy loam	SM, SC-SM	A-2, A-4	---	20-35	75-85	65-80	50-70	30-50	15-25	NP-6
	5-12	Cobbly sandy loam, cobbly loam, cobbly fine sandy loam	SC-SM, SM	A-2, A-4	---	20-35	75-85	65-80	50-70	30-50	15-25	NP-6
	12-28	Very cobbly loam, extremely cobbly sandy clay loam, very cobbly sandy loam	SC-SM, GM, SM, GC-GM	A-2, A-4	---	35-50	55-85	40-80	35-70	25-55	18-30	3-10
	28-63	Extremely cobbly loam, extremely cobbly fine sandy loam, extremely cobbly sandy loam	GC-GM, GM, SC-SM, SM	A-1, A-2, A-4	---	40-55	50-75	35-70	25-60	15-45	15-25	NP-6
Shady-----	0-8	Fine sandy loam, loam	SM, ML, CL-ML	A-4, A-2	---	0-5	85-100	75-100	60-95	30-75	15-30	NP-7
	8-25	Clay loam, sandy clay loam, loam	SC, ML, CL-ML, CL	A-4, A-6	---	0-8	85-100	82-100	65-100	36-80	20-35	2-15
	25-32	Clay loam, sandy clay loam, loam	CL, ML, SC, CL-ML	A-4, A-6	---	0-8	85-100	82-100	65-100	36-80	20-35	2-15
	32-42	Clay loam, sandy clay loam, loam	CL, SC, ML, CL-ML	A-4, A-6	---	8-18	50-85	33-81	20-77	10-61	20-35	2-15
Urban land.	42-72	Loam, gravelly loam, very cobbly sandy loam	SM, SC-SM, ML	A-2, A-4	---	8-18	50-85	33-81	20-77	10-61	15-30	NP-7



Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
DeB, DeC, DeD: Dewey-----  DL. Dumps, landfills  Ec: Ealy-----	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
	0-9 9-72	Silt loam, loam Clay, silty clay, silty clay loam	CL-ML, CL CL	A-4, A-6 A-6	0 0	0 0	90-100 90-100	80-100 80-100	75-95 75-95	65-80 70-85	24-30 27-40	5-11 12-20
	0-10 10-60	Fine sandy loam Loam, fine sandy loam, loamy fine sand	SC-SM, ML, SM, CL-ML SM, SC-SM, ML, CL-ML	A-2, A-4 A-2, A-4	0 0	0 0	85-100 85-100	75-100 75-100	55-95 50-95	30-70 25-70	0-30 0-30	NP-8 NP-8
Craigsville----	0-9 9-21	Cobbly fine sandy loam Gravelly sandy loam, cobbly loam, very gravelly sandy loam, very cobbly sandy loam	CL-ML, ML, SM, SC GC, GM, SC, SM	A-2, A-4 A-1, A-2, A-4	--- ---	25-50 25-60	80-95 50-80	75-95 30-65	50-80 25-60	25-60 15-40	0-25 0-25	NP-10 NP-10
	21-60	Very gravelly loamy sand, very gravelly sandy loam, very cobbly sandy loam, extremely cobbly loamy sand	GM, GC-GM, GC	A-1, A-2	---	35-80	35-55	30-50	20-45	10-25	0-25	NP-8
Eg: Egam-----	0-24 24-72	Silty clay loam Silty clay, silty clay loam, clay	CL, CL-ML CH, CL	A-4, A-6, A-7 A-6, A-7	0 0	0 0	95-100 95-100	95-100 90-100	85-100 85-95	75-95 85-95	21-45 38-60	4-20 15-30

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments			Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
<u>In</u>					<u>Pct</u>	<u>Pct</u>					<u>Pct</u>		
EtB, EtC: Etowah-----	0-7	Loam, silt loam	CL-ML, ML, SC-SM, SM, SC, CL	A-4	0	0	80-100	75-100	70-95	45-70	20-30	3-10	
	7-38	Silty clay loam, clay loam, silt loam	CL	A-6	0	0	80-100	75-100	70-95	65-85	25-35	10-15	
	38-70	Silty clay loam, clay loam, clay	ML, MH, CL, CH	A-6, A-7	0	0	80-100	75-100	70-95	65-85	39-60	15-25	
FuB, FuC, FuD, FuF: Fullerton-----	0-7	Gravelly silt loam	CL, GC-GM, GC, CL-ML	A-2, A-4	---	0-14	60-94	45-90	40-90	30-80	18-30	3-10	
	7-15	Very gravelly loam, gravelly silty clay loam	SC, GC, CL	A-2, A-4, A-6, A-7	---	0-14	60-90	45-90	40-90	30-80	29-42	8-17	
	15-72	Very gravelly clay, gravelly clay, gravelly silty clay	GM, SM, ML, MH	A-2, A-7	---	0-19	50-80	40-75	40-75	30-70	48-78	20-42	
GpC, GpD, GpF: Gilpin-----	0-1	Loam	CL-ML, CL	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15	
	1-5	Loam	CL-ML, CL	A-4, A-6	---	0-5	80-95	75-90	70-85	65-80	20-40	4-15	
	5-34	Channery loam, channery silt loam, channery silty clay loam	CL-ML, CL, GC, SC	A-2, A-4, A-6	---	0-30	50-95	45-90	35-85	30-80	20-40	4-15	
	34-38	Clay, channery clay, channery silty clay loam	GC, GC-GM	A-1, A-2, A-4, A-6	---	0-35	25-55	20-50	15-45	15-40	20-40	4-15	
	38-50	Weathered bedrock			---	---	---	---	---	---	---	---	



Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
GuF: Petros-----	0-1	Very channery silt loam, channery silt loam	ML, GM, CL-ML, CL	A-4	---	5-15	60-80	55-75	50-70	40-60	15-30	NP-8
	1-16	Extremely channery silt loam, very channery silt loam, very channery silty clay loam	GC, GC-GM, GM	A-1, A-2, A-4, A-6	---	10-25	25-49	20-45	15-40	10-36	20-39	3-17
	16-21	Weathered bedrock			---	---	---	---	---	---	---	---
Ha: Hamblen-----	0-5	Silt loam	ML, CL, CL-ML	A-4, A-6	---	0-2	90-100	80-100	65-95	55-85	22-38	3-14
	5-22	Silt loam, loam, clay loam	CL-ML, CL, ML	A-4, A-6	---	0-2	80-100	75-100	60-95	55-85	22-40	3-17
	22-43	Fine sandy loam, silt loam, loam, clay loam	CL, CL-ML, ML	A-4, A-6	---	0-2	80-100	75-100	60-95	55-85	22-40	3-17
	43-62	Sandy loam, silt loam, loam, clay loam	CL, CL-ML, SC, ML	A-2, A-4, A-6	---	0-5	55-100	45-95	35-90	30-80	22-40	3-17
HoB, HoC: Holston-----	0-6	Loam	CL-ML, SM, SC-SM, ML	A-2, A-4	0	0-5	80-100	75-100	65-100	30-75	15-22	NP-6
	6-72	Loam, clay loam, sandy clay loam	SM, ML, CL-ML, SC-SM	A-2, A-4	0	0-5	80-100	75-100	50-100	30-80	21-33	3-10

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
Jec: Jefferson-----	0-1	Cobbly loam	CL, GM, ML, SM	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	1-7	Cobbly loam	CL, GM, ML, SM	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-40	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	SM, SC, ML, CL	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	40-56	Very cobbly clay loam, cobbly loam, cobbly clay loam, gravelly sandy clay loam	ML, CL, SC, SM	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, very gravelly sandy loam	GC-GM, GM, ML, SM	A-4, A-2, A-1	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10
JSD, JSF: Jefferson-----	0-1	Cobbly loam	GM, ML, SM, CL	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	1-7	Cobbly loam	CL, GM, ML, SM	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-40	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	CL, SM, SC, ML	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	40-56	Very cobbly clay loam, cobbly loam, cobbly clay loam, gravelly sandy clay loam	SM, SC, ML, CL	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, very gravelly sandy loam	ML, GC-GM, GM, SM	A-4, A-2, A-1	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
JsD, JsF: Shelocta-----	0-1	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	1-11	Loam	CL-ML, ML	A-4	0-2	0-5	80-95	75-95	60-95	55-90	0-35	NP-10
	11-40	Silty clay loam, silt loam, channery loam, channery silty clay loam	CL-ML, SC, GC, CL	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	40-50	Silty clay loam, silt loam, channery silty clay loam	SC, GC, CL-ML, CL	A-4, A-6	0-5	0-10	55-95	50-95	45-95	40-90	25-40	4-15
	50-60	Weathered bedrock		A-1-b, A-2, A-4, A-6	---	---	---	---	---	---	---	---
JvD, JvF: Jefferson-----	0-1	Cobbly loam	SM, CL, ML, GM	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	1-7	Cobbly loam	SM, ML, GM, CL	A-4, A-2	---	10-35	65-90	60-90	50-80	30-60	20-35	2-10
	7-40	Cobbly loam, cobbly clay loam, gravelly sandy clay loam	SM, SC, ML, CL	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	40-56	Very cobbly clay loam, cobbly loam, cobbly clay loam, gravelly sandy clay loam	CL, ML, SM, SC	A-6, A-4, A-2	---	10-35	75-90	70-90	50-80	30-70	20-40	2-15
	56-60	Cobbly loam, cobbly clay loam, very gravelly sandy loam	GC-GM, GM, ML, SM	A-4, A-2, A-1	---	10-35	55-75	50-75	35-70	20-60	20-35	2-10



Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
Kt: Tupelo-----	In										Pct	
	0-8 8-16	Silt loam Silty clay loam, silt loam	CL-ML, ML, CL CH, CL	A-4 A-6, A-7	0 0	0 0	95-100 95-100	90-100 95-100	80-100 90-100	70-90 85-95	20-35 30-55	3-10 11-29
	16-60	Clay, silty clay	CL, CH	A-7	0	0	95-100	95-100	90-100	85-100	41-70	20-42
LhB, LhC, LhD, LhE: Lily-----	0-2 2-31	Loam Clay loam, sandy clay loam, loam	ML, CL-ML SM, SC, ML, CL	A-4 A-4, A-6	--- ---	0-5 0-5	90-100 90-100	85-100 85-100	70-95 75-100	55-80 40-80	0-35 0-35	NP-10 3-15
	31-35	Sandy clay loam, clay loam, cobbly sandy loam	SC, ML, SM, CL	A-1-b, A-2, A-4, A-6	---	0-10	65-100	50-100	40-95	20-75	0-35	3-15
	35-40	Unweathered bedrock			---	---	---	---	---	---	---	---
LnB, LnC: Lonewood-----	0-6 6-44	Loam Silty clay loam, clay loam, loam	CL-ML, ML, CL CL	A-4 A-6, A-7	0 0	0 0	100 95-100	90-100 85-100	85-100 75-90	75-90 65-85	18-26 29-48	3-9 10-23
	44-60	Channery clay loam, sandy clay loam, loam, clay loam	CL, GC, SC	A-2, A-4, A-6	0	5-25	78-95	69-94	55-94	24-75	20-34	6-14
	60-64	Channery clay loam, sandy clay loam, loam, clay loam	SC, GC, CL	A-2, A-4, A-6	0	5-25	78-95	69-94	55-94	24-75	20-34	6-14
	64-68	Weathered bedrock			---	---	---	---	---	---	---	---
Hendon-----	0-1 1-10 10-25	Silt loam Silt loam Silt loam, loam, clay loam	CL, CL-ML, ML CL, CL-ML, ML CL-ML, CL, ML	A-4 A-4 A-4, A-6	0 0 0	0 0 0	100 100 100	90-100 90-100 90-100	85-100 85-100 80-100	75-90 75-90 65-85	18-30 18-30 20-35	1-9 1-9 3-12
	25-44 44-65	Loam, clay loam Loam, clay loam CL	CL CL	A-4, A-6 A-4, A-6	0 0	0 0	95-100 95-100	85-100 85-100	75-100 75-100	60-85 60-85	25-38 25-40	7-15 7-16

Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
PaC, PaD, PaF: Pailo-----	0-6	Gravelly silt loam, gravelly loam	GC, CL-ML, SC-SM, SC	A-2, A-4	---	0-13	55-80	41-74	35-74	25-67	21-35	4-13
	6-15	Gravelly silt loam, gravelly loam, cobbly	CL, SC, SC-SM, CL-ML	A-2, A-4, A-6	---	10-35	65-80	54-73	46-73	32-66	18-32	4-13
	15-36	silt loam Very gravelly silty clay	SC, CL	A-2	---	10-35	65-80	35-73	30-73	21-69	29-44	13-25
	36-62	loam, very gravelly clay loam, very gravelly loam	CL, SC	A-2	---	10-35	50-78	35-73	30-73	21-69	29-57	13-36
PCF. Pits, clay		loam, gravelly clay, very										
PM. Pits, mine, and dumps		gravelly clay loam, very gravelly silty clay loam, very gravelly clay										
Pp: Pope-----	0-8	Loam	CL, CL-ML, ML, SM	A-4	0	0	85-100	75-100	70-100	45-90	0-30	NP-10
	8-43	Fine sandy loam, sandy loam, loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	0	95-100	80-100	51-95	25-75	0-30	NP-7
	43-60	Very gravelly sandy loam, loamy sand	SM, ML, SC-SM, GM	A-1, A-2, A-4	---	0-20	45-100	35-100	30-95	15-70	0-30	NP-7





Table 17.—Engineering Index Properties—Continued

[illegible]



Table 17.—Engineering Index Properties—Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
TSC, TsD: Sunlight-----	0-8	Gravelly loam, channery sandy loam	GM, SM, ML, GC-GM, GC	A-4	0	0-5	50-85	50-80	35-70	35-60	0-40	NP-10
	8-17	Very gravelly clay loam, channery loam, very channery clay loam, very channery silt loam	GC, GC-GM, SC	A-1-b, A-2, A-4, A-6	0	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	17-48	Weathered bedrock			---	---	---	---	---	---	---	---
UUC. Urban land- Udorthents												
W. Water												
Wa: Wax-----	0-9	Gravelly loam	SC, SC-SM	A-4	0-5	9-20	80-95	70-90	60-90	40-80	18-31	4-11
	9-28	Gravelly clay loam, loam, silty clay loam	SC, SC-SM	A-6, A-4	0-5	9-20	80-95	70-90	60-90	40-80	21-43	6-18
	28-46	Very gravelly silt loam, very gravelly loam, very gravelly clay loam	CL, SC	A-2-4, A-6	0-5	15-20	45-70	30-60	25-60	20-55	25-43	8-18
	46-72	Very gravelly clay loam, very gravelly clay	SM, SC, CL, MH	A-2-6, A-7-5, A-7-6	0-5	15-20	45-70	30-65	25-65	20-60	31-61	11-28



Table 18.—Physical and Chemical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Soil reaction	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors		
									Kw	Kf	T
	In	pH	Pct	g/cc	In/hr	In/in	Pct	Pct			
Ac:											
Allegheny-----	0-6	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.22	0.0-2.9	1.0-4.0	.32	.32	4
	6-12	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.22	0.0-2.9	0.2-0.8	.32	.32	
	12-21	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.13-0.18	0.0-2.9	0.0-0.5	.28	.28	
	21-36	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.13-0.18	0.0-2.9	0.0-0.5	.28	.28	
	36-60	3.6-5.5	10-35	1.20-1.40	0.60-2.00	0.08-0.17	0.0-2.9	0.0-0.2	.28	.28	
Cotaco-----	0-4	3.6-5.5	7-27	1.20-1.40	0.60-6.00	0.12-0.20	0.0-2.9	1.0-4.0	.37	.37	3
	4-24	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.07-0.15	0.0-2.9	0.2-0.8	.28	.32	
	24-45	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.07-0.15	0.0-2.9	0.0-0.5	.28	.32	
	45-60	3.6-5.5	15-35	1.20-1.50	0.60-2.00	0.07-0.15	0.0-2.9	0.0-0.5	.28	.32	
AeB, AeC, AeD:											
Allen-----	0-6	4.5-6.0	10-25	1.30-1.50	0.60-2.00	0.14-0.19	0.0-2.9	0.5-3.0	.28	.28	5
	6-42	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.2-0.5	.20	.20	
	42-48	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.0-0.5	.20	.20	
	48-56	4.5-6.0	20-45	1.40-1.60	0.60-2.00	0.10-0.17	0.0-2.9	0.0-0.5	.20	.20	
	56-72	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.0-0.5	.20	.20	
AMC:											
Allen-----	0-6	4.5-6.0	10-25	1.30-1.50	0.60-2.00	0.14-0.19	0.0-2.9	0.5-3.0	.28	.28	5
	6-42	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.2-0.5	.20	.20	
	42-48	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.0-0.5	.20	.20	
	48-56	4.5-6.0	20-45	1.40-1.60	0.60-2.00	0.10-0.17	0.0-2.9	0.0-0.5	.20	.20	
	56-72	4.5-6.0	18-35	1.40-1.60	0.60-2.00	0.12-0.17	0.0-2.9	0.0-0.5	.20	.20	
Urban land.											
AnB:											
Altavista-----	0-6	3.6-6.5	10-24	1.30-1.50	2.00-6.00	0.12-0.20	0.0-2.9	0.5-3.0	.24	.24	5
	6-58	3.6-6.5	18-35	1.30-1.50	0.60-2.00	0.12-0.20	0.0-2.9	0.2-0.8	.24	.24	
	58-72	3.6-6.5	18-35	1.30-1.50	0.60-2.00	0.12-0.20	0.0-2.9	0.0-0.5	.24	.24	
AsF:											
Apison-----	0-5	4.5-5.5	10-15	1.30-1.45	0.60-2.00	0.15-0.20	0.0-2.9	1.0-3.0	.37	.37	3
	5-23	4.5-5.5	18-30	1.35-1.50	0.60-2.00	0.13-0.18	0.0-2.9	0.0-0.5	.37	.37	
	23-60	---	---	---	0.00-0.20	---	---	---	---	---	
Sunlight-----	0-8	4.5-5.5	10-27	1.40-1.60	0.60-2.00	0.08-0.14	0.0-2.9	1.0-2.0	.24	.28	2
	8-17	4.5-5.5	18-35	1.50-1.70	0.60-2.00	0.10-0.18	0.0-2.9	0.0-0.5	.17	.28	
	17-48	---	---	---	0.00-0.20	---	---	---	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

[illegible]



Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Soil reaction	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Erosion factors		
								Organic matter	Kw	T
	In	pH	Pct	g/cc	In/hr	In/in	Pct	Pct		
Ec: Ealy-----	0-10	4.5-5.5	5-18	1.40-1.60	2.00-6.00	0.14-0.18	0.0-2.9	1.0-3.0	.32	5
	10-60	4.5-5.5	5-18	1.40-1.65	2.00-6.00	0.12-0.18	0.0-2.9	0.2-1.0	.32	
Craigsville-----	0-9	4.5-5.5	5-15	1.20-1.40	2.00-20.00	0.07-0.15	0.0-2.9	1.0-3.0	.20	3
	9-21	4.5-5.5	5-15	1.30-1.60	2.00-20.00	0.06-0.15	0.0-2.9	0.2-1.0	.17	.28
	21-60	4.5-5.5	5-10	1.35-1.55	6.00-20.00	0.04-0.09	0.0-2.9	0.2-0.8	.17	.28
Eg: Egam-----	0-24	5.6-7.3	20-35	1.30-1.45	0.20-0.60	0.18-0.22	3.0-5.9	2.0-4.0	.32	5
	24-72	5.6-7.3	35-50	1.30-1.45	0.20-0.60	0.14-0.20	3.0-5.9	0.0-0.5	.32	
EtB, EtC: Etowah-----	0-7	4.5-6.0	15-27	1.30-1.45	0.60-2.00	0.15-0.20	0.0-2.9	0.5-3.0	.32	5
	7-38	4.5-6.0	23-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	
	38-70	4.5-5.5	32-45	1.40-1.55	0.60-2.00	0.16-0.20	0.0-2.9	0.0-0.5	.32	
FuB, FuC, FuD, FuF: Fullerton-----	0-7	4.5-6.0	10-27	1.45-1.55	0.60-2.00	0.10-0.16	0.0-2.9	0.5-2.0	.28	5
	7-15	4.5-5.5	10-27	1.45-1.55	0.60-2.00	0.10-0.15	0.0-2.9	0.2-1.2	.24	.28
	15-72	4.5-5.5	40-70	1.45-1.55	0.60-2.00	0.10-0.14	3.0-5.9	0.0-0.5	.20	.24
GpC, GpD, GpF: Gilpin-----	0-1	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-4.0	.32	3
	1-5	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	
	5-34	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.12-0.16	0.0-2.9	0.0-0.5	.24	.28
	34-38	3.6-5.5	15-45	1.20-1.50	0.60-2.00	0.08-0.12	0.0-2.9	0.0-0.5	.24	.32
	38-50	---	---	---	0.00-0.20	---	---	---	---	---
GuF: Gilpin-----	0-1	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-4.0	.32	3
	1-5	3.6-5.5	15-27	1.20-1.40	0.60-2.00	0.12-0.18	0.0-2.9	0.5-1.0	.32	
	5-34	3.6-5.5	18-35	1.20-1.50	0.60-2.00	0.12-0.16	0.0-2.9	0.0-0.5	.24	.28
	34-38	3.6-5.5	15-45	1.20-1.50	0.60-2.00	0.08-0.12	0.0-2.9	0.0-0.5	.24	.32
	38-50	---	---	---	0.00-0.20	---	---	---	---	---
Bouldin-----	0-2	4.5-5.5	10-20	1.35-1.50	2.00-6.00	0.06-0.10	0.0-2.9	1.0-2.0	.20	5
	2-6	4.5-5.5	10-20	1.35-1.50	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.20	.28
	6-16	4.5-5.5	17-35	1.40-1.55	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.20	.28
	16-40	4.5-5.5	17-35	1.40-1.55	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.20	.28
	40-64	4.5-5.5	17-35	1.40-1.55	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.20	.28
Petros-----	64-80	4.5-5.5	17-35	1.40-1.55	2.00-6.00	0.06-0.10	0.0-2.9	0.0-0.5	.20	.28
	0-1	4.5-5.5	15-25	1.30-1.50	0.60-6.00	0.10-0.14	0.0-2.9	0.5-2.0	.20	.28
	1-16	4.5-5.5	18-32	1.30-1.55	0.60-6.00	0.04-0.09	0.0-2.9	0.0-0.5	.15	.24
	16-21	---	---	---	0.00-0.20	---	---	---	---	---

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Soil reaction	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors		
									Kw	Kf	T
	In	pH	Pct	g/cc	In/hr	In/in	Pct	Pct			
<b>Ha:</b>											
Hamblen-----	0-5	5.1-7.3	15-25	1.30-1.45	0.60-2.00	0.18-0.20	0.0-2.9	1.0-3.0	.32	.32	5
	5-22	5.1-7.3	18-32	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	0.5-1.5	.32	.32	
	22-43	5.1-7.3	15-32	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	0.5-1.0	.32	.32	
	43-62	5.1-7.3	15-32	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	0.5-1.0	.32	.32	
<b>HoB, HoC:</b>											
Holston-----	0-6	5.5-6.5	10-25	1.35-1.50	0.60-2.00	0.15-0.20	0.0-2.9	0.5-2.0	.28	.28	5
	6-72	4.5-5.5	18-35	1.40-1.55	0.60-2.00	0.13-0.20	0.0-2.9	0.0-0.5	.32	.32	
<b>Jec:</b>											
Jefferson-----	0-1	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	1-7	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-1.0	.17	.28	
	7-40	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.2-0.8	.17	.24	
	40-56	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.0-0.5	.17	.24	
	56-60	4.5-5.5	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	0.0-0.5	.17	.24	
<b>JSD, JSF:</b>											
Jefferson-----	0-1	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	1-7	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-1.0	.17	.28	
	7-40	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.2-0.8	.17	.24	
	40-56	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.0-0.5	.17	.24	
	56-60	4.5-5.5	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	0.0-0.5	.17	.24	
<b>Shelocta:</b>											
Shelocta-----	0-1	4.5-5.5	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	1-11	4.5-5.5	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-1.0	.32	.32	
	11-40	4.5-5.5	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.2-0.5	.28	.32	
	40-50	4.5-5.5	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.0-0.5	.28	.32	
	50-60	---	---	---	0.00-0.20	---	---	---	---	---	
<b>JvD, JvF:</b>											
Jefferson-----	0-1	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-5.0	.17	.28	5
	1-7	4.5-5.5	10-25	1.30-1.50	2.00-6.00	0.10-0.16	0.0-2.9	0.5-1.0	.17	.28	
	7-40	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.2-0.8	.17	.24	
	40-56	4.5-5.5	18-34	1.30-1.65	2.00-6.00	0.10-0.16	0.0-2.9	0.0-0.5	.17	.24	
	56-60	4.5-5.5	15-30	1.30-1.65	2.00-6.00	0.08-0.14	0.0-2.9	0.0-0.5	.17	.24	
<b>Varilla:</b>											
Varilla-----	0-1	3.6-6.5	3-20	1.00-1.40	2.00-6.00	0.10-0.13	0.0-2.9	1.0-5.0	.10	.28	3
	1-7	3.6-6.5	3-20	1.00-1.40	2.00-6.00	0.10-0.13	0.0-2.9	0.5-1.5	.10	.28	
	7-44	3.6-6.5	3-20	1.45-1.65	2.00-6.00	0.05-0.10	0.0-2.9	0.2-0.8	.10	.24	
	44-60	3.6-6.5	3-20	1.45-1.65	2.00-20.00	0.01-0.05	0.0-2.9	0.0-0.5	.10	.20	
<b>Shelocta:</b>											
Shelocta-----	0-1	4.5-5.5	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-5.0	.32	.32	3
	1-11	4.5-5.5	10-25	1.15-1.30	0.60-2.00	0.16-0.22	0.0-2.9	0.5-1.0	.32	.32	
	11-40	4.5-5.5	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.2-0.5	.28	.32	
	40-50	4.5-5.5	18-34	1.30-1.55	0.60-2.00	0.10-0.20	0.0-2.9	0.0-0.5	.28	.32	
50-60	---	---	---	---	0.00-0.20	---	---	---	---	---	

Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Soil reaction	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors		
									Kw	Kf	T
Kt: Ketona-----	In	pH	Pct	g/cc	In/hr	In/in	Pct	Pct			
	0-6	6.1-7.8	25-50	1.20-1.55	0.60-2.00	0.14-0.20	3.0-5.9	1.0-4.0	.32	.32	3
	6-48 48-52	6.1-8.4 ---	35-60 ---	1.20-1.35 ---	0.06-0.20 0.00-0.00	0.12-0.18 ---	6.0-8.9 ---	0.2-0.8 ---	.32 ---	.32 ---	
Tupelo-----	0-8	5.5-7.3	18-27	1.35-1.50	0.60-2.00	0.18-0.22	0.0-2.9	1.0-3.0	.37	.37	5
	8-16	5.5-7.3	18-35	1.40-1.55	0.60-2.00	0.15-0.20	3.0-5.9	0.2-0.8	.32	.32	
	16-60	5.5-7.8	40-65	1.40-1.55	0.06-0.20	0.12-0.16	6.0-8.9	---	.28	.28	
LhB, LhC, LhD, LhE: Lily-----	0-2	3.6-5.5	7-27	1.20-1.40	0.60-6.00	0.13-0.18	0.0-2.9	0.5-4.0	.28	.37	2
	2-31	3.6-5.5	18-35	1.25-1.35	2.00-6.00	0.12-0.18	0.0-2.9	0.1-0.5	.28	.28	
	31-35 35-40	3.6-5.5 ---	10-35 ---	1.25-1.35 ---	2.00-6.00 0.00-0.20	0.08-0.17 ---	0.0-2.9 ---	0.0-0.5 ---	.17 ---	.24 ---	
LnB, LnC: Lonewood-----	0-6	4.5-5.5	15-25	1.30-1.45	0.60-2.00	0.18-0.20	0.0-2.9	1.0-3.0	.37	.37	3
	6-44	4.5-5.5	25-45	1.40-1.55	0.60-2.00	0.14-0.17	0.0-2.9	0.0-0.5	.32	.32	
	44-60 60-64 64-68	4.5-5.5 4.5-5.5 ---	20-40 20-40 ---	1.40-1.55 1.40-1.55 ---	0.60-2.00 0.60-2.00 0.00-0.20	0.05-0.11 0.05-0.11 ---	0.0-2.9 0.0-2.9 ---	0.0-0.5 0.0-0.5 ---	.32 .32 ---	.32 .32 ---	
Hendon-----	0-1	4.5-5.5	12-25	1.30-1.45	0.60-2.00	0.17-0.21	0.0-2.9	1.0-3.0	.37	.37	5
	1-10	4.5-5.5	12-25	1.30-1.45	0.60-2.00	0.17-0.21	0.0-2.9	0.2-0.8	.37	.37	
	10-25 25-44 44-65	4.5-5.5 4.5-5.5 4.5-5.5	18-32 18-35 20-35	1.35-1.45 1.45-1.65 1.45-1.55	0.60-2.00 0.20-0.60 0.60-2.00	0.16-0.20 0.13-0.17 0.13-0.17	0.0-2.9 0.0-2.9 0.0-2.9	0.0-0.5 0.0-0.5 0.0-0.2	.37 .32 .32	.37 .32 .32	
PaC, PaD, PaF: Pailo-----	0-6	3.6-5.5	8-20	1.35-1.55	2.00-6.00	0.07-0.12	0.0-2.9	1.0-2.0	.20	.32	5
	6-15	3.6-5.5	8-20	1.35-1.55	2.00-6.00	0.05-0.10	0.0-2.9	0.0-0.5	.15	.28	
	15-36 36-62	3.6-5.5 3.6-5.5	20-35 20-50	1.40-1.60 1.40-1.60	2.00-6.00 2.00-6.00	0.05-0.10 0.05-0.10	0.0-2.9 0.0-2.9	0.0-0.5 0.0-0.5	.15 .15	.28 .28	
PCF. Pits, clay											
PM. Pits, mine, and dumps											
Pp: Pope-----	0-8	3.6-5.5	5-15	1.20-1.40	0.60-2.00	0.14-0.23	0.0-2.9	1.0-4.0	.37	.37	5
	8-43	3.6-5.5	5-18	1.30-1.60	0.60-6.00	0.10-0.18	0.0-2.9	0.2-1.0	.28	.28	
	43-60	3.6-5.5	5-20	1.30-1.60	0.60-6.00	0.10-0.18	0.0-2.9	0.2-0.8	.28	.20	





Table 18.—Physical and Chemical Properties of the Soils—Continued

Map symbol and soil name	Depth	Soil reaction	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Erosion factors		
								Organic matter	Kw	Kf T
	In	pH	Pct	g/cc	In/hr	In/in	Pct	Pct		
WbB2, WbC2, WbD2:										
Waynesboro-----	0-5	4.5-6.0	15-27	1.40-1.55	0.60-2.00	0.15-0.21	0.0-2.9	0.5-2.0	.28	.28 5
	5-37	4.5-5.5	35-60	1.40-1.55	0.60-2.00	0.13-0.18	3.0-5.9	0.0-0.5	.28	.28
	37-65	4.5-5.5	35-60	1.40-1.55	0.60-2.00	0.13-0.18	3.0-5.9	0.0-0.5	.28	.28
WfB:										
Wolftever-----	0-8	4.5-6.5	22-40	1.35-1.45	0.60-2.00	0.17-0.20	0.0-2.9	1.0-3.0	.37	.37 5
	8-72	4.5-5.5	35-55	1.40-1.60	0.20-0.60	0.13-0.17	3.0-5.9	0.0-0.5	.32	.32

Table 19.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Restrictive layer			Risk of corrosion	
	Kind	Depth to top <u>In</u>	Hardness	Uncoated steel	Concrete
Ac: Allegheny-----	---	---	---	Low	High
Cotaco-----	Bedrock (lithic)	48-100	Indurated	Moderate	High
AeB, AeC, AeD: Allen-----	---	---	---	Low	Moderate
AMC: Allen-----	---	---	---	Low	Moderate
Urban land.					
AnB: Altavista-----	---	---	---	Moderate	Moderate
AsF: Apison-----	Bedrock (paralithic)	20-40	Moderately cemented	Moderate	Moderate
Sunlight-----	Bedrock (paralithic)	10-20	Moderately cemented	Low	High
Salacoa-----	Bedrock (paralithic)	60-100	Moderately cemented	Moderate	Moderate
At: Atkins-----	---	---	---	High	Moderate
BaE: Barfield-----	Bedrock (lithic)	8-20	---	High	Low
Rock outcrop.					
BEF: Bethesda-----	---	---	---	Moderate	High
Mine pits.					
Bm: Bloomington-----	---	---	---	High	Low
CaB, CaC: Capshaw-----	Bedrock (paralithic)	40-80	Moderately cemented	High	Moderate
Cb: Cobstone-----	---	---	---	Low	Moderate
CDB: Cobstone-----	---	---	---	Low	Moderate
Shady-----	---	---	---	Low	Moderate
Urban land.					

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Risk of corrosion	
	Kind	Depth to top In	Hardness	Uncoated steel	Concrete
CeC:					
Colbert-----	Bedrock (lithic)	40-72	Indurated	High	Moderate
Lyerly-----	Bedrock (lithic)	20-40	Indurated	High	Moderate
CgC, CgD:					
Collegedale-----	---	---	---	High	Moderate
CoC:					
Conasauga-----	Bedrock (paralithic)	20-40	Moderately cemented	High	High
Cr:					
Cranmore-----	---	---	---	High	Moderate
DeB, DeC, DeD:					
Dewey-----	---	---	---	High	Moderate
DL. Dumps, landfills					
Ec:					
Ealy-----	---	---	---	Low	Moderate
Craigsville-----	---	---	---	Moderate	Moderate
Eg:					
Egam-----	---	---	---	High	Low
EtB, EtC:					
Etowah-----	---	---	---	Low	Moderate
FuB, FuC, FuD, FuF:					
Fullerton-----	---	---	---	High	Moderate
GpC, GpD, GpF:					
Gilpin-----	Bedrock (paralithic)	20-40	Moderately cemented	Low	High
GuF:					
Gilpin-----	Bedrock (paralithic)	20-40	Moderately cemented	Low	High
Bouldin-----	---	---	---	Low	Moderate
Petros-----	Bedrock (paralithic)	10-20	Moderately cemented	Low	Moderate
Ha:					
Hamblen-----	---	---	---	Moderate	Moderate
HoB, HoC:					
Holston-----	---	---	---	Moderate	High
JeC:					
Jefferson-----	---	---	---	Moderate	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Risk of corrosion	
	Kind	Depth to top In	Hardness	Uncoated steel	Concrete
JsD, JsF: Jefferson-----	---	---	---	Moderate	High
Shelocta-----	Bedrock (paralithic)	40-80	Moderately cemented	Low	High
JvD, JvF: Jefferson-----	---	---	---	Moderate	High
Varilla-----	---	---	---	Low	High
Shelocta-----	Bedrock (paralithic)	40-80	Moderately cemented	Low	High
Kt: Ketona-----	Bedrock (lithic)	40-72	Indurated	High	Moderate
Tupelo-----	Bedrock (lithic)	60-100	Indurated	High	Moderate
LhB, LhC, LhD, LhE: Lily-----	Bedrock (lithic)	20-40	Indurated	Moderate	High
LnB, LnC: Lonewood-----	Bedrock (lithic)	40-72	Indurated	Low	Moderate
Hendon-----	Fragipan	18-36	Weakly cemented	Low	Moderate
PaC, PaD, PaF: Pailo-----	---	---	---	Low	High
PCF. Pits, clay					
PM. Pits, mine, and dumps					
Pp: Pope-----	---	---	---	Low	High
Philo-----	---	---	---	Low	High
RaC: Ramsey-----	Bedrock (lithic)	7-20	Indurated	Low	Moderate
RrD, RrF: Ramsey-----	Bedrock (lithic)	7-20	Indurated	Low	Moderate
Rock outcrop.					
SaC: Salacoa-----	Bedrock (paralithic)	60-100	Moderately cemented	Moderate	Moderate
SgE: Sequoia-----	Bedrock (paralithic)	20-40	Moderately cemented	High	Moderate
Gilpin-----	Bedrock (paralithic)	20-40	Moderately cemented	Low	High

Table 19.—Soil Features—Continued

Map symbol and soil name	Restrictive layer			Risk of corrosion	
	Kind	Depth to top In	Hardness	Uncoated steel	Concrete
ShB, Sm: Shady-----	---	---	---	Low	Moderate
St: Staser-----	---	---	---	Low	Low
TaD: Talbutt-----	Bedrock (lithic)	20-40	---	High	Moderate
Rock outcrop.					
TmB, TmC, TmD: Tasso-----	Fragipan	18-36	Very weakly cemented	Moderate	Moderate
Minvale-----	---	---	---	Moderate	Low
TsC, TsD: Townley-----	Bedrock (paralithic)	20-40	Moderately cemented	Moderate	High
Sunlight-----	Bedrock (paralithic)	10-20	Moderately cemented	Low	High
UUC. Urban land-Udorthents					
W. Water					
Wa: Wax-----	Fragipan	18-36	Weakly cemented	Moderate	Moderate
Rockdell-----	---	---	---	Low	Moderate
WbB2, WbC2, WbD2: Waynesboro-----	---	---	---	High	High
WfB: Wolftever-----	---	---	---	High	High

Table 20.—Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
Ac: Allegheny-----	B	January	---	---	Very brief	Occasional
		February	---	---	Very brief	Occasional
		March	---	---	Very brief	Occasional
		December	---	---	Very brief	Occasional
Cotaco-----	C	January	1.5-3.0	>6.0	Very brief	Occasional
		February	1.5-3.0	>6.0	Very brief	Occasional
		March	1.5-3.0	>6.0	Very brief	Occasional
		April	1.5-3.0	>6.0	---	None
		May	1.5-3.0	>6.0	---	None
		December	1.5-3.0	>6.0	Very brief	Occasional
AeB, AeC, AeD: Allen-----	B	Jan-Dec	---	---	---	None
AMC: Allen-----	B	Jan-Dec	---	---	---	None
Urban land.						
AnB: Altavista-----	C	January	1.5-2.5	>6.0	---	None
		February	1.5-2.5	>6.0	---	None
		March	1.5-2.5	>6.0	---	None
		April	1.5-2.5	>6.0	---	None
		December	1.5-2.5	>6.0	---	None
AsF: Apison-----	B	Jan-Dec	---	---	---	None
Sunlight-----	D	Jan-Dec	---	---	---	None
Salacoa-----	B	Jan-Dec	---	---	---	None
At: Atkins-----	D	January	0.0-1.0	>6.0	Very brief	Frequent
		February	0.0-1.0	>6.0	Very brief	Frequent
		March	0.0-1.0	>6.0	Very brief	Frequent
		April	0.0-1.0	>6.0	Very brief	Frequent
		May	0.0-1.0	>6.0	Very brief	Frequent
		November	0.0-1.0	>6.0	Very brief	Frequent
		December	0.0-1.0	>6.0	Very brief	Frequent

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
BaE: Barfield-----	D	Jan-Dec	---	---	---	None
Rock outcrop.						
BEF: Bethesda-----	C	Jan-Dec	---	---	---	None
Mine pits.						
Bm: Bloomingdale-----	D	January	0.0-1.0	>6.0	Brief	Frequent
		February	0.0-1.0	>6.0	Brief	Frequent
		March	0.0-1.0	>6.0	Brief	Frequent
		April	0.0-1.0	>6.0	Brief	Frequent
		May	0.0-1.0	>6.0	Brief	Frequent
		November	0.0-1.0	>6.0	Brief	Frequent
		December	0.0-1.0	>6.0	Brief	Frequent
CaB, CaC: Capshaw-----	C	January	3.5-5.0	>6.0	---	None
		February	3.5-5.0	>6.0	---	None
		March	3.5-5.0	>6.0	---	None
		December	3.5-5.0	>6.0	---	None
Cb: Cobstone-----	B	January	---	---	Very brief	Rare
		February	---	---	Very brief	Rare
		March	---	---	Very brief	Rare
		April	---	---	Very brief	Rare
		May	---	---	Very brief	Rare
		November	---	---	Very brief	Rare
		December	---	---	Very brief	Rare
CDB: Cobstone-----	B	January	---	---	Very brief	Rare
		February	---	---	Very brief	Rare
		March	---	---	Very brief	Rare
		April	---	---	Very brief	Rare
		May	---	---	Very brief	Rare
		November	---	---	Very brief	Rare
		December	---	---	Very brief	Rare
Shady-----	B	January	5.0-6.0	>6.0	Very brief	Rare
		February	5.0-6.0	>6.0	Very brief	Rare
		March	5.0-6.0	>6.0	Very brief	Rare
		April	---	---	Very brief	Rare
		May	---	---	Very brief	Rare
		November	---	---	Very brief	Rare
		December	5.0-6.0	>6.0	Very brief	Rare

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
CDB: Urban land.						
CeC: Colbert-----	D	January	3.5-5.0	5.2-6.0	---	None
		February	3.5-5.0	5.2-6.0	---	None
		March	3.5-5.0	5.2-6.0	---	None
		December	3.5-5.0	5.2-6.0	---	None
Lyerly-----	D	January	1.8-3.3	2.3-3.3	---	None
		February	1.8-3.3	2.3-3.3	---	None
		March	1.8-3.3	2.3-3.3	---	None
		December	1.8-3.3	2.3-3.3	---	None
CgC, CgD: Collegedale-----	C	Jan-Dec	---	---	---	None
CoC: Conasauga-----	C	January	1.2-3.3	1.7-3.3	---	None
		February	1.2-3.3	1.7-3.3	---	None
		March	1.2-3.3	1.7-3.3	---	None
		December	1.2-3.3	1.7-3.3	---	None
Cr: Cranmore-----	D	January	0.0-1.0	>6.0	Brief	Frequent
		February	0.0-1.0	>6.0	Brief	Frequent
		March	0.0-1.0	>6.0	Brief	Frequent
		April	0.0-1.0	>6.0	Brief	Frequent
		May	0.0-1.0	>6.0	Brief	Frequent
		November	0.0-1.0	>6.0	Brief	Frequent
		December	0.0-1.0	>6.0	Brief	Frequent
DeB, DeC, DeD: Dewey-----	B	Jan-Dec	---	---	---	None
DL. Dumps, landfills						
Ec: Ealy-----	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		April	---	---	Very brief	Occasional
		May	---	---	Very brief	Occasional
		November	---	---	Very brief	Occasional
		December	5.0-6.0	>6.0	Very brief	Occasional

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
Ec: Craigsville-----	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		April	---	---	Very brief	Occasional
		May	---	---	Very brief	Occasional
		November	---	---	Very brief	Occasional
		December	5.0-6.0	>6.0	Very brief	Occasional
Eg: Egam-----	C	January	3.0-4.0	>6.0	---	None
		February	3.0-4.0	>6.0	---	None
		March	3.0-4.0	>6.0	---	None
		December	3.0-4.0	>6.0	---	None
EtB, EtC: Etowah-----	B	Jan-Dec	---	---	---	None
FuB, FuC, FuD, FuF: Fullerton-----	B	Jan-Dec	---	---	---	None
GpC, GpD, GpF: Gilpin-----	C	Jan-Dec	---	---	---	None
GuF: Gilpin-----	C	Jan-Dec	---	---	---	None
Bouldin-----	B	Jan-Dec	---	---	---	None
Petros-----	D	Jan-Dec	---	---	---	None
Ha: Hamblen-----	C	January	2.0-3.0	>6.0	Very brief	Occasional
		February	2.0-3.0	>6.0	Very brief	Occasional
		March	2.0-3.0	>6.0	Very brief	Occasional
		December	2.0-3.0	>6.0	Very brief	Occasional
HoB, HoC: Holston-----	B	Jan-Dec	---	---	---	None
JeC: Jefferson-----	B	Jan-Dec	---	---	---	None
JsD, JsF: Jefferson-----	B	Jan-Dec	---	---	---	None
Shelocta-----	B	Jan-Dec	---	---	---	None

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
JvD, JvF: Jefferson-----	B	Jan-Dec	---	---	---	None
Varilla-----	B	Jan-Dec	---	---	---	None
Shelocta-----	B	Jan-Dec	---	---	---	None
Kt: Ketona-----	D	January	0.5-1.0	>6.0	Brief	Frequent
		February	0.5-1.0	>6.0	Brief	Frequent
		March	0.5-1.0	>6.0	Brief	Frequent
		April	0.5-1.0	>6.0	Brief	Frequent
		November	0.5-1.0	>6.0	---	None
		December	0.5-1.0	>6.0	Brief	Frequent
Tupelo-----	D	January	1.0-2.0	>6.0	Brief	Frequent
		February	1.0-2.0	>6.0	Brief	Frequent
		March	1.0-2.0	>6.0	Brief	Frequent
		April	1.0-2.0	>6.0	Brief	Frequent
		November	1.0-2.0	>6.0	---	None
		December	1.0-2.0	>6.0	Brief	Frequent
LhB, LhC, LhD, LhE: Lily-----	B	Jan-Dec	---	---	---	None
LnB, LnC: Lonewood-----	B	Jan-Dec	---	---	---	None
Hendon-----	C	January	1.7-3.0	>6.0	---	None
		February	1.7-3.0	>6.0	---	None
		March	1.7-3.0	>6.0	---	None
		December	1.7-3.0	>6.0	---	None
PaC, PaD, PaF: Pailo-----	B	Jan-Dec	---	---	---	None
PCF. Pits, clay						
PM. Pits, mine, and dumps						
Pp: Pope-----	B	January	---	---	Very brief	Frequent
		February	---	---	Very brief	Frequent
		March	---	---	Very brief	Frequent
		April	---	---	Very brief	Frequent
		November	---	---	Very brief	Frequent
		December	---	---	Very brief	Frequent

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
Pp: Philo-----	B	January	1.5-3.0	>6.0	Very brief	Frequent
		February	1.5-3.0	>6.0	Very brief	Frequent
		March	1.5-3.0	>6.0	Very brief	Frequent
		April	1.5-3.0	>6.0	Very brief	Frequent
		November	---	---	Very brief	Frequent
		December	1.5-3.0	>6.0	Very brief	Frequent
RaC: Ramsey-----	D	Jan-Dec	---	---	---	None
RrD, RrF: Ramsey-----	D	Jan-Dec	---	---	---	None
Rock outcrop.						
SaC: Salacoa-----	B	Jan-Dec	---	---	---	None
SgE: Sequoia-----	C	Jan-Dec	---	---	---	None
Gilpin-----	C	Jan-Dec	---	---	---	None
ShB: Shady-----	B	January	5.0-6.0	>6.0	---	None
		February	5.0-6.0	>6.0	---	None
		March	5.0-6.0	>6.0	---	None
		December	5.0-6.0	>6.0	---	None
Sm: Shady-----	B	January	5.0-6.0	>6.0	Very brief	Occasional
		February	5.0-6.0	>6.0	Very brief	Occasional
		March	5.0-6.0	>6.0	Very brief	Occasional
		December	---	---	Very brief	Occasional
St: Staser-----	B	January	4.0-6.0	>6.0	---	None
		February	4.0-6.0	>6.0	---	None
		March	4.0-6.0	>6.0	---	None
		December	4.0-6.0	>6.0	---	None
TaD: Talbott-----	C	Jan-Dec	---	---	---	None
Rock outcrop.						

Table 20.—Water Features—Continued

Map symbol and soil name	Hydro- logic group	Month	Water table		Flooding	
			Upper limit	Lower limit	Duration	Frequency
			<u>Ft</u>	<u>Ft</u>		
TmB, TmC, TmD: Tasso-----	B	January	2.0-3.0	3.0-4.0	---	None
		February	2.0-3.0	3.0-4.0	---	None
		March	2.0-3.0	3.0-4.0	---	None
		December	2.0-3.0	3.0-4.0	---	None
Minvale-----	B	Jan-Dec	---	---	---	None
TsC, TsD: Townley-----	C	Jan-Dec	---	---	---	None
Sunlight-----	C	Jan-Dec	---	---	---	None
UUC. Urban land-Udorthents						
W. Water						
Wa: Wax-----	C	January	1.5-3.0	1.5-3.0	Very brief	Occasional
		February	1.5-3.0	1.5-3.0	Very brief	Occasional
		March	1.5-3.0	1.5-3.0	Very brief	Occasional
		April	1.5-3.0	1.5-3.0	Very brief	Occasional
		November	---	---	Very brief	Occasional
		December	1.5-3.0	1.5-3.0	Very brief	Occasional
Rockdell-----	B	January	3.5-5.0	>6.0	Very brief	Occasional
		February	3.5-5.0	>6.0	Very brief	Occasional
		March	3.5-5.0	>6.0	Very brief	Occasional
		April	3.5-5.0	>6.0	Very brief	Occasional
		November	3.5-5.0	>6.0	Very brief	Occasional
		December	3.5-5.0	>6.0	Very brief	Occasional
WbB2, WbC2, WbD2: Waynesboro-----	B	Jan-Dec	---	---	---	None
WfB: Wolftever-----	C	January	2.5-3.5	>6.0	---	None
		February	2.5-3.5	>6.0	---	None
		March	2.5-3.5	>6.0	---	None
		December	2.5-3.5	>6.0	---	None

Table 21.—Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Allegheny-----	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Allen-----	Fine-loamy, siliceous, semiactive, thermic Typic Paleudults
Altavista-----	Fine-loamy, mixed, semiactive, thermic Aquic Hapludults
*Apison-----	Fine-loamy, siliceous, semiactive, thermic Typic Hapludults
Atkins-----	Fine-loamy, mixed, active, acid, mesic Fluvaquentic Endoaquepts
Barfield-----	Clayey, mixed, active, thermic Lithic Hapludolls
Bethesda-----	Loamy-skeletal, mixed, active, acid, mesic Typic Udorthents
Bloomington-----	Fine, mixed, semiactive, nonacid, thermic Typic Endoaquepts
Bouldin-----	Loamy-skeletal, siliceous, subactive, mesic Typic Paleudults
Capshaw-----	Fine, mixed, semiactive, thermic Oxyaquic Hapludalfs
Cobstone-----	Loamy-skeletal, siliceous, semiactive, thermic Typic Hapludults
Colbert-----	Fine, smectitic, thermic Vertic Hapludalfs
Collegedale-----	Fine, mixed, semiactive, thermic Typic Paleudults
Conasauga-----	Fine, mixed, semiactive, thermic Oxyaquic Hapludalfs
Cotaco-----	Fine-loamy, mixed, active, mesic Aquic Hapludults
Craigsville-----	Loamy-skeletal, mixed, superactive, mesic Fluventic Dystrudepts
Cranmore-----	Coarse-loamy, mixed, semiactive, nonacid, thermic Fluvaquentic Endoaquepts
Dewey-----	Fine, kaolinitic, thermic Typic Paleudults
Ealy-----	Coarse-loamy, siliceous, semiactive, mesic Fluventic Dystrudepts
Egam-----	Fine, mixed, active, thermic Cumulic Hapludolls
Etowah-----	Fine-loamy, siliceous, semiactive, thermic Typic Paleudults
Fullerton-----	Fine, kaolinitic, thermic Typic Paleudults
Gilpin-----	Fine-loamy, mixed, active, mesic Typic Hapludults
Hamblen-----	Fine-loamy, siliceous, semiactive, thermic Fluvaquentic Eutrudepts
Hendon-----	Fine-loamy, siliceous, semiactive, mesic Fragic Paleudults
Holston-----	Fine-loamy, siliceous, semiactive, thermic Typic Paleudults
Jefferson-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Ketona-----	Fine, mixed, superactive, thermic Vertic Epiaqualfs
Lily-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lonewood-----	Fine-loamy, siliceous, semiactive, mesic Typic Hapludults
Lyerly-----	Very fine, mixed, active, thermic Oxyaquic Vertic Hapludalfs
Minvale-----	Fine-loamy, siliceous, subactive, thermic Typic Paleudults
Pailo-----	Loamy-skeletal, siliceous, semiactive, thermic Typic Paleudults
Petros-----	Loamy-skeletal, mixed, semiactive, mesic, shallow Typic Dystrudepts
Philo-----	Coarse-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
Pope-----	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Ramsey-----	Loamy, siliceous, subactive, mesic Lithic Dystrudepts
Rockdell-----	Loamy-skeletal, siliceous, active, thermic Dystric Fluventic Eutrudepts
Salacoa-----	Fine-loamy, mixed, active, thermic Typic Hapludalfs
Sequoia-----	Fine, mixed, semiactive, mesic Typic Hapludults
Shady-----	Fine-loamy, mixed, subactive, thermic Typic Hapludults
Shelocta-----	Fine-loamy, mixed, active, mesic Typic Hapludults
Staser-----	Fine-loamy, mixed, active, thermic Cumulic Hapludolls
Sunlight-----	Loamy-skeletal, mixed, semiactive, thermic, shallow Inceptic Hapludults
Talbott-----	Fine, mixed, semiactive, thermic Typic Hapludalfs
Tasso-----	Fine-loamy, siliceous, semiactive, thermic Fragic Paleudults
Townley-----	Fine, mixed, semiactive, thermic Typic Hapludults
Tupelo-----	Fine, mixed, semiactive, thermic Aquic Hapludalfs
Udorthents-----	Udorthents
Varilla-----	Loamy-skeletal, siliceous, semiactive, mesic Typic Dystrudepts
Wax-----	Fine-loamy, siliceous, semiactive, thermic Typic Fragiudults
Waynesboro-----	Fine, kaolinitic, thermic Typic Paleudults
Wolftever-----	Fine, mixed, semiactive, thermic Aquic Hapludults

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